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IBM fleshes out plans for SystemView

By Edwin Mier
Special to Network World

Hoping to clear some of the smoke from what has been termed Big Blue's latest "vaporware architecture," IBM last week divulged some details on SystemView, the network and systems management architecture it announced last fall.

The Open Systems Interconnection-based SystemView comprises numerous as yet unannounced products, along with future versions of some existing products, including NetView, IBM's host-based Systems Network Architecture net management system.

The architecture is intended to enable customers to manage heterogeneous, enterprisewide information systems networks. As such, Kathy Howell, IBM's director of systems management, called NetView "an essential part of SystemView."

The SystemView details revealed last week by Howell and other IBM managers included:

- Users should not expect to deploy SystemView until 1994 or 1995.

A critical mass of all the necessary SystemView pieces will not occur for three to four years,

(continued on page 56)

The SystemView framework

Availability	To achieve critical mass by 1994 or 1995.
Function	"IBM's systems management strategy for operating heterogeneous, enterprisewide information systems."
Strategic role	IBM's SAA strategy for systems management. Adds host and data base systems to the network as managed resources. NetView is a key SystemView component.
Network support	Will manage resources across SNA, TCP/IP and OSI networks. SNMP support is conspicuously absent from SystemView documentation. AIX platforms will be managed as OSI agents.
Message formats	All manager-agent communications to be conducted via OSI/CMIP data units. Management data will be in the form of defined objects (from 200 to 1,000 objects to be formally detailed in specification that is due by year end).
Interfaces	IBM is adding its own specifications (such as for screen icons and application interfaces) to OSI standards (CMIP and CMIS). Any OSI agent will be supported; key SystemView interfaces will be published.

CMIP = Common Management Information Protocol
CMIS = Common Management Information Service
SAA = Systems Application Architecture
SNMP = Simple Network Management Protocol

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

Networking project to aid IRS in snaring tax evaders

By Maureen Molloy
Staff Writer

WASHINGTON, D.C. — If you plan on missing today's deadline for filing your taxes, take notice: The Internal Revenue Service is involved in a major network project designed to help the agency collect billions of dollars from tax dodgers.

As part of its Integrated Collection System (ICS) project, the IRS is outfitting offices with local-area network-based workstations and portable computers that will let agents access common data bases of information on problem taxpayers. ICS will automate what are today largely manual operations, enabling agents to merge data from scattered electronic and paper records in order to quickly nab tax cheats.

The IRS estimates that ICS will enable it to bring in an additional $2.5 billion in delinquent taxes over the next seven years.

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Virus breaks out on 3Com's campus net

Prompt response lets vendor contain outbreak, purge infected files and minimize data loss.

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — A computer virus last week forced 3Com Corp. to shut down major portions of its campus network here for several hours in order to contain the bug and enable LAN administrators to delete infected files.

The outbreak hit the firm's 5,000-node network mid-morning last Tuesday, and employees said portions of the net were down all day while the staff worked to isolate infected workstations and remove the virus.

The network was back on-line the following morning.

The problem first cropped up when 3Com's network help desk began fielding calls from users about personal computers locking up and unusual pictures appearing on workstation screens, said Richard Porter, manager of network administration at 3Com.

Calls were coming into the help desk from different points across 3Com's four-building campus, which houses nine local-area networks, he said. For security reasons, he declined to specify which departments were affected.

After checking file sizes on the affected workstations, LAN administrators realized a virus was spreading across the network.

Network officials immediately

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General Electric Co. deploys a centralized X.500 E-mail directory. See story, page 25.

GRAPHIC BY SUSAN J. CHAMPENY

AT&T resets SDN, SDDN rates, speeds

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T last week restructured pricing and volume discounts for its Software-Defined Network (SDN) and Software-Defined Data Network (SDDN) services and upgraded SDDN to support 384K bit/sec transmission speeds.

AT&T said it will raise rates for SDN users with switched access by about 5% and increase rates for calls made during the evening and night/weekend periods. The carrier trimmed prices between 1% and 2% for SDN calls using dedicated access.

Overall, AT&T said the changes will reduce SDN prices by about $1.2 million.

But at the same time, AT&T moved to raise its SDN revenue by about $1.1 million by restructur-

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NETLINE

SECURITIES FIRM WRAPS up work on a T-1 network that is designed to cut trading costs. Page 2.

UNISYS INTROS long-awaited Unix-based OLTP software. Page 4.

PRODIGY IS PROBED for possible civil or criminal violations related to E-mail pricing and BBS policies. Page 4.

MICROSOFT SET TO OFFER repackaged version of Network Courier. Page 5.

BELL ATLANTIC to unveil unique IBM NetView interface that organizes net management alarms. Page 56.

UNISYS UNWRAPS new LAN Manager/X, Portable NetWare for U 6000 Unix processors. Page 58.

NEWSPAPER

FEATURE

The network manager's compendium of standards

By Steven Turner
Special to Network World

For network managers struggling to map out a comprehensive open network strategy, the task of rounding up information about current standards can be daunting.

To help managers sort out the standards that will affect them, *Network World* offers an overview of some of the more important network-related standards that have been developed during the past 15 months.

Open Systems Interconnection standards have been in development since 1979. However, it has only been within the past year that OSI net control standards matured enough to allow products to be finalized.

The International Standards Organization (ISO) and the Consultative Committee on International Telephony and Telegraphy often cooperate on OSI standards. (Some of the more important standards organizations in the networking community are listed in Figure 1 on page 42.)

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Teleport-Chicago says its net is first based on SONET

Fifteen-mile fiber net links major carrier POPs with 20 area buildings, including the Sears Tower.

By Bob Brown
Senior Editor

CHICAGO — Teleport Communications-Chicago last week began operating what company officials said is the country's first telecommunications net based on Synchronous Optical Network (SONET) technology.

Teleport Chicago's backbone net here has been built from the ground up with SONET-compatible equipment, enabling Teleport Chicago to offer end-user data transmission speeds from 56K to 2.488G bit/sec.

Company officials said no specific SONET-enabled services are available yet, but high-speed, bandwidth on demand and advanced network monitoring services based on SONET will be rolled out shortly.

SONET is a high-speed, circuit-switched technology that supports transmission rates from 51.84M to 13.22G bit/sec over fiber-optic networks.

Largely because of the lack of SONET-compatible carrier equipment and customer premises equipment on the market, few SONET installations have surfaced to date.

Teleport Chicago's network is

(continued on page 5)

Securities firm's T-1 net to reduce transaction costs

Lower prices mean more services for customers.

By Barton Crockett
Senior Editor

NEW YORK — Garban Securities, Inc. last week said it has nearly finished work on a T-1 backbone net that will dramatically reduce transaction costs for key trading applications.

Garban, along with sister companies Garvin GuyButler Corp. and Titus and Donnelly, Inc., will use 20 T-1 circuits to link offices here to network nodes in Chicago, Los Angeles, San Francisco and Washington, D.C. These links will carry voice and data traffic supporting trading in government securities as well as other financial instruments.

David Walsh, Garban's director of technology, claimed that the T-1 backbone will give the firm a competitive edge by enabling it to quickly route around net outages and more rapidly deliver network services to new subscribers.

Walsh claimed that the net will give Garban lower transaction costs than its competitors, allowing the company to deliver more services to users. Garban also plans to sell switched and dedicated network services to trading customers.

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FTS 2000 carriers called on to provide digital access

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The General Services Administration will announce later this month an agreement with AT&T and US Sprint Communications Co. that details how the carriers must provide local digital access facilities under Federal Telecommunications System (FTS) 2000.

The FTS 2000 contract stipulates that AT&T and US Sprint must deal with local exchange carriers to obtain local access for federal agencies. But government net managers say they are having difficulty in getting local digital facilities and that the two long-haul carriers are not providing what the contract promised — end-to-end digital links.

Growing complaints about local access problems have sent the GSA, the agency administering the FTS 2000 contract, into a huddle with AT&T and US Sprint in an attempt to ease concerns.

Last week, Mike Corrigan, the GSA's assistant commissioner for telecommunications services, said the agency would soon release a policy statement detailing exactly what AT&T and US Sprint must do to ensure that local access facilities are made available.

Corrigan declined to comment on what the statement will entail, saying it is still being drafted. Although the goal of the talks was to ensure digital access for all users, he said, "There are questions about where it can't be done."

(continued on page 59)

Briefs

SONET goes to school. AT&T and Ameritech Corp. recently started a Synchronous Optical Network (SONET) joint field trial in which Illinois Bell Telephone Co. is providing a high-speed fiber link between the University of Illinois at Urbana-Champaign and an AT&T point of presence.

The link connects the university's Digital Computing Lab to the Experimental University Network (XUNET). XUNET is a nationwide research network connecting AT&T and several local exchange carriers and universities. Researchers on the network are conducting experiments in high-speed data communications, including distributed virtual memory and high-speed switch control.

Distributed virtual memory is a model for memory management in a distributed computing environment. Research in high-speed switch control will investigate ways to quickly set up circuits for advanced data processing applications.

The network is based on AT&T DDM-2000 SONET multiplexers at the university's Digital Computing Lab, an Illinois Bell central office and an AT&T central office.

US Sprint sings South Pacific tune. US Sprint Communications Co. last week said it has purchased capacity on four submarine fiber cables scheduled to be installed in the Pacific Ocean. These cables are Hawaii-5, which will link California to Hawaii in 1993; Pacific Rim East, linking New Zealand to Hawaii in 1993; Pacific Rim West, connecting Australia to Guam, Japan and Asia in 1994; and Tasman-2, which will link Australia to New Zealand in 1993. The cables will supplement capacity US Sprint owns on the North Pacific Cable, which is scheduled to begin carrying traffic this month between Alaska, Japan and Oregon.

Navy awards CAD/CAM contract. The U.S. Navy last week awarded a 12-year contract to Intergraph Corp. for networked computer-aided design and manufacturing (CAD/CAM) systems.

The contract, with a potential value of $362.4 million, calls for Intergraph and its teaming partners — CASDE Corp., Jonathan Corp., Martin Marietta Information Systems Group and 3Com Corp. — to provide a wide range of equipment, software and services to shipyards under the Naval Sea Systems Command. The shipyards are upgrading their engineering and design facilities in order to meet the demands of the military's Computer-Aided Acquisition and Logistics Support program to convert paper-based information to digital format in the 1990s.

The Intergraph award is the first of four contracts expected to be awarded under the Navy's $2 billion CAD-2 effort. The next part of the contract to be awarded will be the $600 million Naval Facilities Command CAD-2 contract at the end of the year.

Public mail interconnection. IBM and GE Information Services (GEIS) last week announced they have interconnected their public electronic messaging networks using X.400. The link will enable users of IBM's Information Network Mail Exchange to trade messages with users of GEIS' Quik-Comm electronic mail service and GEnie on-line information service.

Newbridge, AT&T in joint deal. Newbridge Networks, Inc. last week announced it has signed two three-year agreements with AT&T International Communication Services under which the companies will jointly market their respective products and services to users with international networks. The two companies signed a comarketing agreement to cooperate on bids for international networks. They also signed an deal under which AT&T can secure Newbridge products at competitive prices when those products are included in an AT&T proposal to an international customer.

FCC gives first PCN carriers an edge. The Federal Communications Commission last week adopted a "Pioneer's Preference" rule that would grant valuable radio spectrum to innovators of personal communications network (PCN) services, allowing them to operate regional services without having to compete with other carriers. Tom Stanley, the FCC's chief engineer, noted that Pioneer's Preference will not automatically be granted to companies holding licenses to conduct PCN spread-spectrum experiments. Under the new rules, companies must vie for Pioneer's Preference by filing a petition describing the proposed service and be able to demonstration the service.

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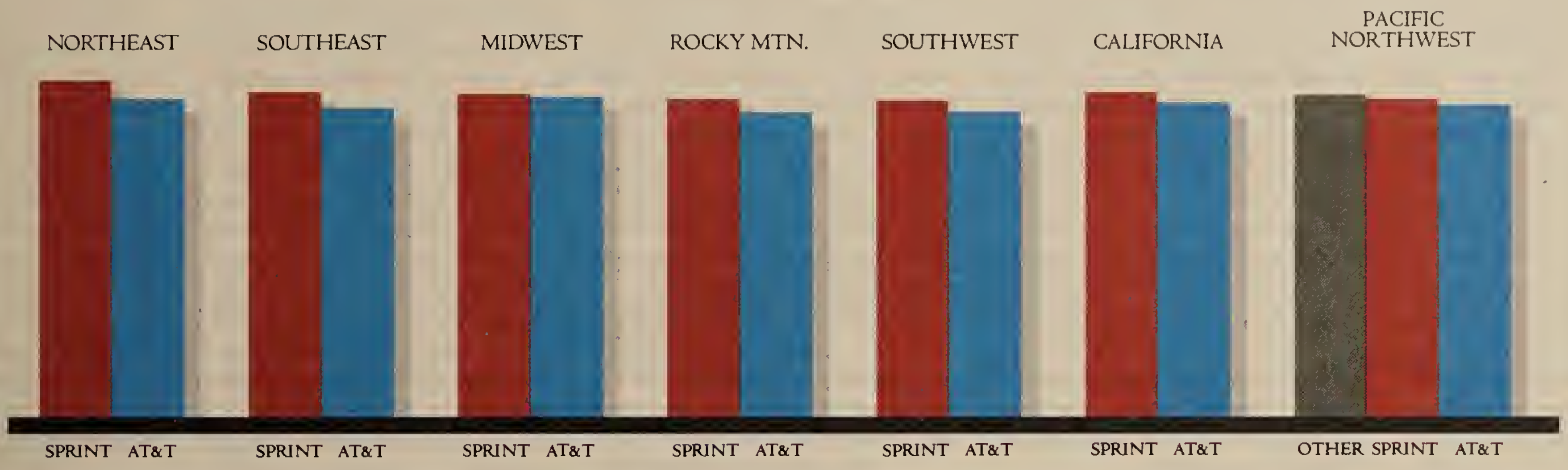

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1988 *Sprint awarded 40% of Federal Telecommunications System 2000 contract.* 1989 *Sprint completes the world's first and largest privately-owned transatlantic fiber optic cable.* 1990 *Sprint announces the first commercial video services to the Soviet Union.*

Unisys unveils long-awaited distributed OLTP software

By Jim Brown
Senior Editor

NEW YORK — Unisys Corp. last week introduced its long-promised distributed on-line transaction processing (OLTP) software, which lets client workstations extract or update data on multiple servers.

The Unix-based Open/OLTP software, announced in 1989, is scheduled to ship later this month. The product is based on Version 4.1 of AT&T's Tuxedo Transaction Manager and runs on Unisys' U 6000 processors, which run a version of AT&T's Unix.

Open/OLTP conforms to X/Open Company, Ltd.'s Distributed Transaction Processing (DTP) standard.

Unisys also introduced a version of AT&T's LAN Manager/X and enhanced communications products for the U 6000s (see related story, page 58).

Users were pleased with the announcements, saying Open/OLTP will help them link data bases and will go a long way toward disproving a common notion that Unix cannot support OLTP efficiently.

"Unix hasn't been accepted in the commercial market for transaction processing," said Thomas Murphy, president of USE, Inc., Unisys' user group, and director of technical support for the Naval Computer and Telecommunications Station in Newport, R.I. Open/OLTP "might help it gain some respect."

Developers can use Unisys' Ally fourth-generation language as well as COBOL or C to develop client and server modules that work with Open/OLTP. The client portion supports a graphical user interface and generates screens used to request data or perform data entry.

The client uses the Transport Layer Interface in AT&T's Unix to pass information to the U 6000 running Open/OLTP over Transmission Control Protocol/Internet Protocol, X.25, Ethernet, IBM Systems Network Architecture or Open Systems Interconnection nets. Open/OLTP establishes links to one or more servers and issues commands to extract or update data.

The software assembles all data into a single packet and ships it back to the client or sends a message stating that an update was completed. If a problem prevents functions from being performed, Open/OLTP uses X/Open's two-phase commit protocol to cancel tasks and tell the client to try again.

The only data base management system outfitted to work with Open/OLTP is a DTP-compliant version of Informix Software, Inc.'s OnLine, which will be sold exclusively by Unisys until October. Open/OLTP will work with other DBMSs as vendors roll out DTP-compliant products.

Open/OLTP will also be bundled with Unisys' Extract 3270 and Extract 2200 software, which enable users to extract copies of data from IBM hosts and Unisys

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Correction: The article "Future networks will take a big RISC," (*NW,* April 8) incorrectly stated that Hewlett-Packard Co.'s HP LaserJet IIIsi can print 17 pages per second. It prints 17 pages per minute.

DA probes BBS practices at Prodigy

By Barton Crockett
Senior Editor

LOS ANGELES — The Los Angeles County district attorney's office is investigating Prodigy Services Co. for possible criminal or civil violations stemming from its E-mail pricing and bulletin board editing policies, *Network World* has learned.

The investigation, which could result in legal action within a month, adds fuel to the controversy surrounding the information services provider's decision to levy charges on volume electronic mail usage and its acknowledged practice of editing and deleting certain messages on its public bulletin board systems.

When Prodigy debuted in 1988, it touted flat-rate monthly pricing as a key selling point against other information services companies. But in January, the company raised hackles with some customers when it started charging 25 cents for every E-mail message after the first 30 sent in a month. In addition, many users claim that Prodigy's practice of deleting or editing controversial or obscene messages from bulletin boards violates the First Amendment.

Officials in the district attorney's office say they are investigating complaints about both practices. Richard Goldston, the senior investigator handling the Prodigy case, said legal action against the company could be initiated within a month.

"Based on what I've seen so far, this is at the stage of determining whether we go [with a] civil or criminal [case]," he said.

Goldston said charges could include unfair business practices or deceptive advertising. He declined to discuss the complaints, investigation or possible legal actions further.

Richard de la Sota, the Los Angeles County deputy district attorney in charge of the case, emphasized that the investigation is still in its early stages.

A Prodigy spokesman said the company was unaware of the investigation and could not comment on it. But he said Prodigy's E-mail pricing policy was justified to prevent customers from using

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Microsoft to unveil E-mail for DOS, OS/2 computers

By Caryn Gillooly
Senior Editor

REDMOND, Wash. — Microsoft Corp. today plans to release Microsoft Mail for PC Networks Version 2.1, a repackaged version of Consumers Software, Inc.'s Network Courier.

The release represents Microsoft's first electronic mail software for DOS- and OS/2-based personal computers and stems from its recent purchase of Consumers Software ("Microsoft to buy E-mail maker to fill gap in line," *NW,* March 11). Previously, Microsoft only offered a version of Microsoft Mail for Apple Computer, Inc. Macintosh client workstations.

The new release will include server and workstation software, as well as a suite of gateways to link users of the E-mail package to other vendors' messaging environments.

Kathleen Schoenfelder, Microsoft Mail product manager, said the company will offer free upgrades of the software to Consumers Software's existing Network Courier users, primarily because Microsoft made some slight modifications to the original product.

According to Schoenfelder, the software's packaging is designed to give users added flexibility over previous Network Courier versions. The product will include an electronic post office, message router and Modem Mail — a former Consumers Software product that gives remote users dial-in access to the E-mail server.

The client portion will be available in five-, 20-, 100- and 500-user configurations.

Break from the past

That's a shift from Network Courier packaging in which Consumers Software forced users to install a new server portion of the E-mail software if they wished to add users. By contrast, Microsoft Mail for PC Networks server software is installed once, and customers add user support simply by adding client modules.

"In the past, if you bought a [Network Courrier] 150-user pack, the server was limited to 150 users," Schoenfelder said. "If you wanted to add users, you had to change all the licensing," as well as install a new server portion of the software.

Schoenfelder also pointed out that Microsoft Mail for PC Networks is hardware- and operating system-independent. "You can own 2.1 no matter what you have — DOS, OS/2 or [Microsoft] Windows" she said. Previously, if customers changed workstation operating systems, a new version of the software was necessary.

With this announcement, Microsoft will offer gateways to IBM's Professional Office System, X.400 nets, facsimile machines, Message Handling System-based nets, the Simple Mail Transfer Protocol and MCI Communications Corp.'s MCI Mail, Schoenfelder said.

Microsoft Mail for PC Networks Version 2.1 server software costs $695, while workstation software costs $395, $1,349, $5,500 and $22,500 for the five-, 20-, 100- and 500-user versions, respectively.

The gateway connecting Microsoft Mail for PC Networks and Macintosh products costs $295. All are available now. ☒

Teleport touts first SONET net

continued from page 2

anchored by SONET-capable AT&T Digital Access and Cross-Connect Systems located at Teleport Chicago's network center.

AT&T DDM-1000 multiplexers, which will soon be upgraded to AT&T's new SONET-capable DDM-2000 multiplexers, have been deployed at several customer locations.

The backbone network will initially operate at 155M bit/sec. The high-speed SONET signals on the backbone are typically broken down by transmission equipment at the customer site to lower speed circuits such as T-1 and T-3.

The Chicago SONET network spans 15 miles and links the Big Three long-distance carriers local points of presence to the Sears Tower and about 20 other buildings here.

The first two customers to sign on for alternative access services from Teleport Chicago are Montgomery Securities and Telerate Systems, Inc.

Many other users are contemplating signing on, mostly for disaster recovery purposes rather than to access potential SONET-enabled services or to send data at gigabit speeds.

"What we're saying to users is that we've made a very serious commitment to SONET for the long term," said Chuck Buckman, general manager and vice-president of Teleport Chicago. The company will work with users to develop services that take advantage of the SONET technology, he added.

Roger Martinez, vice-president of telecommunications at the Chicago Board of Trade, said the lack of available SONET equipment on the market makes it unlikely that the Board of Trade will be able to take advantage of SONET-based services any time soon.

"But it's a positive sign that Teleport has put SONET in place now to support our future needs," Martinez added.

According to Dick Tomlinson, president of Connecticut Research Report, a Glastonbury, Conn., market research firm that recently released a study of the bypass industry, Teleport Chicago's foray into SONET technology is commendable.

"Teleport's support of SONET will put pressure on other carriers to do the same," Tomlinson said. ☒

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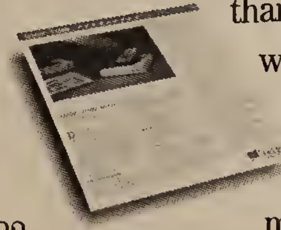

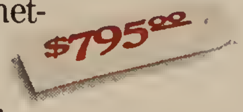

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Of the 157 telecommunications companies to receive financing in 1990, 34 were local-area network-related, according to a survey conducted by Accel Partners, a San Francisco-based venture capital firm. By contrast, only seven wide-area network companies received financing last year, the survey stated.

People & Positions

The **Department of Justice** recently announced that **Roger Cooper,** formerly deputy administrator for management of the Farmers Home Administration at the Department of Agriculture, has been named to head the Justice Department's Information Resources Management division.

As deputy assistant attorney general, Cooper will oversee the department's computer and telecommunications planning and purchases.

VMX, Inc., a San Jose, Calif., voice processing systems supplier, recently announced the appointment of **Jean-Michel Paute** as managing director for the continental European region.

Paute will be responsible for marketing and sales of VMX voice processing and response systems in all continental European countries.

Previously, Paute was president of EuroLink Corp., a data communications consulting firm in Dallas.

Northern Telecom, Inc. has announced that **William Morgan,** formerly vice-president of Fujitsu America, Inc., has joined the switch manufacturer as senior vice-president of operations.

Novell buys into AT&T unit to gain Unix net know-how

Seeks expertise to integrate Unix, NetWare nets.

By Ellen Messmer
Washington Correspondent

PROVO, Utah — Novell, Inc. last week said it has purchased an equity stake in AT&T subsidiary Unix System Laboratories, Inc. (USL) to assist the supplier of network operating systems in its effort to integrate Unix and NetWare local-area networks.

Bob Davis, Novell's director of product marketing, said Novell sees Unix as one of the fastest growing segments of the computer industry and expects it to be one of several strategic operating systems supported on enterprise networks.

Davis would not say how much Novell spent to buy into USL, but sources close to the company said it purchased a 4.6% equity stake in the Unix company. Novell did acknowledge that it has become the single largest outside shareholder in the $80 million AT&T subsidiary.

USL develops and markets the Unix System V operating system and related products such as the OSI Communications Platform, an implementation of Open Systems Interconnection protocols designed to network Unix computers.

A primary reason Novell was attracted to USL was the opportunity it afforded the vendor to work with other USL partners, especially Sun Microsystems, Inc., Davis said.

AT&T has sold off between 20% and 30% of the shares in USL to 11 concerns at an undisclosed price to build international support for Unix as an open systems standard. Other USL investors are Amdahl Corp., Fujitsu, Ltd., ICL PLC, Ing. C. Olivetti & Company, S.p.A., the Institute for Information Industry (Taiwan), Motorola, Inc., NEC Corp., OKI Electric Industry Company, Ltd., Sun Microsystems and Toshiba Corp.

In making the announcement of the minority stake in UCL, Robert Kavner, an AT&T group executive, said, "AT&T is convinced that the best way to nurture the growth of the open systems movement and to share in it ourselves is to establish an independent Unix Systems Laboratory with the technical guidance of Unix International and the business advice of investors who will ensure that USL is run properly and profitably."

While AT&T hopes outside vendor involvement in Unix development will help establish its Unix version as an international standard, that is not Novell's fundamental goal, Davis said.

"Novell is not trying to define for the world the right thing all these operating systems should do," Davis said. "We're just interested in bringing Unix networks into the enterprise."

INDUSTRY BRIEFS

PacBell to sell Memotec packet gear. Pacific Bell's Data Communications Group last week announced a joint marketing agreement with Memotec Data, Inc. to sell terminal equipment to customers using Pacific Bell's public packet-switching services.

Under the agreement, Pacific Bell will market Memotec's line of packet assembler/disassemblers, switches and network control systems to Data Communications Group customers in the Los Angeles, Sacramento, San Diego and San Francisco areas. Pacific Bell said it is working out similar agreements with other vendors. The carrier also plans to offer turnkey data application solutions and network integration consulting services.

Global carriers contemplate venture. A British Telecommunications PLC spokesman recently confirmed that the company is talking with Japan's dominant domestic carrier, Nippon Telegraph and Telephone Corp., and the monopoly German carrier, Deutsche Bundespost Telekom, about creating a joint venture company in the U.S.

The spokesman declined to say what the joint venture would entail, though some published reports said it will be an outsourcing operation dubbed Pathfinder. The spokesman said British Telecom will likely make an announcement about the venture this year.

Good things in small packages

VSAT makers roll out compact products

Sept. 1990	GTE Spacenet unveiled low-cost version of Skystar private hub.
Dec. 1990	Hughes Network Systems introduced industry's first major line of reduced-size VSAT dishes with antennas as small as 0.75 meters.
Jan. 1991	Scientific-Atlanta rolled out scaled-down version of its SkylinX.25 private VSAT network hub, as well as low-cost VSATs with 1- and 1.2-meter antennas.
May 1991	GTE Spacenet announces plan to offer low-cost VSATs with submeter antennas, which are expected to be available in the third quarter.

SOURCE: GTE SPACENET CORP., MCLEAN, VA., HUGHES NETWORK SYSTEMS, INC., GERMANTOWN, MD., AND SCIENTIFIC-ATLANTA, INC., MELBOURNE, FLA.
GRAPHIC BY SUSAN J. CHAMPENY

VSAT firms shrink gear to cut net costs

Compact hubs, dishes let users extend nets to low-volume sites, may lure terrestrial service users.

By Bob Brown
Senior Editor

Vendors of very small aperture terminal equipment are flooding the market with compact, low-cost VSAT dishes and hubs that make it less costly to operate a satellite network, putting them on a par price-wise with new switched service offerings.

The products may be a boon to some users by providing them with an alternative to switched services for sites that generate low volumes of network traffic. In addition, the move could woo some users over to VSATs that had previously committed to terrestrial services because the buy-in costs for satellite nets were too high.

While VSAT providers have been pumping out compact hubs and VSATs since last fall, GTE Spacenet Corp. last week became the latest vendor to announce plans to roll out a low-cost VSAT dish with a submeter antenna.

The new VSAT, which will initially have two ports and support two protocols simultaneously, is scheduled to become generally available in the third quarter of 1991.

The company declined to provide more details about the VSATs, although one executive said the company will probably make a formal announcement of the product in May.

Getting small

When the product hits the market, GTE Spacenet will join the ranks of Hughes Network Systems, Inc. and Scientific-Atlanta, Inc., which previously unveiled low-cost, compact VSAT models.

Last fall, GTE Spacenet started the move to lower VSAT equipment costs when it introduced a compact, low-cost version of its Skystar central-site VSAT hub.

Like full-sized central-site VSAT hubs, compact hubs provide users with network management control, but the compact hubs are closer in price to shared hubs.

Lower costs

Low-end VSATs such as those announced by Hughes and Scientific-Atlanta enable users to reduce the cost of linking each site into a VSAT network, enabling users to extend their VSAT nets to low-traffic sites and sites where a larger VSAT would be aesthetically unpleasing.

Hughes introduced the first major line of reduced-size VSAT dishes featuring antennas as small as 0.75 meters late last year ("Hughes new PES VSAT line offers range of models," *NW,* Dec. 10, 1990).

Users can install the low-end VSATs in existing networks of larger VSATs to create hybrid networks, according to Paul Gaske, vice-president of Hughes' VSAT Marketing Group.

Earlier this year, Scientific-Atlanta announced VSATs featuring 1- and 1.2-meter antennas, as opposed to more conventional 1.8-meter antennas, under its new SkylinX.25 Express VSAT network offering.

SkylinX.25 Express also included a scaled-down version of Scientific-Atlanta's SkylinX.25 private VSAT network hub that costs about 33% less than the company's previous hub

(continued on page 12)

AT&T introduces the biggest thing to hit contact lens sales since shag carpeting.

AT&T Integrated Services Digital Network (ISDN) gave Bausch & Lomb the capability to take 1,000 more orders per week.

Ask most people what AT&T ISDN has to do with the contact lens business and they'll probably tell you it's the first line on the eye chart. But if you ask the people at Bausch & Lomb, they'll tell you about a digital technology so innovative, it lets them answer a lot more calls using the same number of live operators they had before.

Not too long ago, Bausch & Lomb's customer service center was getting a lot more calls than they could handle. Realizing that lost calls can turn into lost customers, they called AT&T for help.

Through AT&T ISDN, Bausch & Lomb got a feature called Automatic Number Identification (ANI). With ANI, their computers can automatically capture each caller's phone number and match it to the customer's record. The end result? Call handling time has been cut by an average of four seconds per call. Which means Bausch & Lomb's customer service representatives can now handle about 1,000 more weekly calls than they could before.

So if you've been looking for a way to boost sales without taking on more overhead, call off the search. AT&T's contact lens solution could be the answer for your business, too.

Innovation. Another AT&T advantage.

For more information about AT&T ISDN, call your AT&T Account Executive or 1 800 247-1212, Ext. 144.

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CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

AT&T predicts that the U.S. fiber-optic cable market will grow from its current value of $100 million to $850 million by 1995 and that the worldwide fiber market will almost double from $1.2 billion to $2.1 billion over that same period.

Carrier Watch

Metropolitan Fiber Systems (MFS) of San Francisco, Inc. recently said Softguard Systems, Inc. will use MFS of San Francisco-provided alternative access service to carry voice traffic to its interexchange carrier's point of presence.

Softguard Systems President David Mosby said his company perceives MFS of San Francisco as offering a higher level of customer service than Pacific Bell. "Because MFS is more responsive, we've chosen to use it for a substantial amount of our local access service needs."

Mosby cited route diversity as another reason for choosing MFS of San Franciso over Pacific Bell.

The 926-fiber-mile network, which began operating in September 1989, now provides service to users in 15.4 million square feet of office space in San Francisco's business district.

AT&T has announced that the Commercial Union Insurance Co. signed a four-year agreement for a statewide Software-Defined Network that will link 62 of its sites to its Boston headquarters.

The SDN installation will be phased in over several months, and all Commercial Union sites should be on-line by the end of the third quarter, according to an AT&T spokesman.

AT&T Network Systems

(continued on page 12)

First phase of N.Y. ISDN trial completed with ease

Carriers, switch makers link switches via SS7.

By Bob Brown
Senior Editor

NEW YORK — A group of carriers and switch makers has completed the first phase of a multivendor ISDN technology trial ordered by the New York State Public Service Commission (PSC) two years ago.

The objective of the first phase of the trial was to link the switches used by multiple carriers via Signaling System 7 (SS7), the key underpinning of Integrated Services Digital Network offerings and other intelligent network services.

Technically, SS7 connectivity among carriers using switching equipment from the same manufacturers proved to be easy. The bigger challenge was to put in place a process to facilitate future negotiations between long-haul and local carriers for the provisioning and maintenance of SS7 circuits, trial participants said.

The New York PSC-based ISDN trial is intended to encourage carriers to work together to provide users with ISDN and other services supported by an integrated, multicarrier SS7 network.

Participating in the trial are Alltel New York, Inc., a subsidiary of Alltel Corp.; AT&T; AT&T Network Systems; Contel of New York; MCI Communications Corp.; New York Telephone Co.; Northern Telecom, Inc.; Rochester Telephone Corp.; and TC Systems, Inc., a subsidiary of Teleport Communications Group.

In Phase 1 of the trial, Alltel, New York Telephone and MCI linked their Northern Telecom DMS-100 and DMS-250 switches in Manhattan and Jamestown, N.Y., using SS7. This part of the trial was completed in January.

Also in the first phase of the trial, New York Telephone, Rochester Telephone and AT&T connected their AT&T 4ESS and 5ESS central office switches in Manhattan and Rochester via a separate SS7 network. That test has just been completed.

Phase 2 of the trial, now in progress, calls for providing Basic Rate Interface and Primary Rate Interface services to customers of the separate AT&T- and Northern Telecom-based networks. Eastman Kodak Co., Shearson Lehman Brothers, Inc. and Young & Rubicam, Inc. are among the companies preparing to test ISDN applications.

The third and final phase of the trial will demonstrate ISDN interoperability between the AT&T and Northern Telecom networks. Some preliminary testing of this capability will begin this month, according to the technical subcommittee working on the Northern Telecom SS7 network. This will involve demonstrating

(continued on page 12)

WASHINGTON UPDATE

BY ANITA TAFF

Users ask for tighter rule on service quality. Users told the Federal Communications Commission last week that the agency needs to tighten and expand its rules requiring local carriers to report service quality each year. Changes are needed, they say, because the carriers may be tempted to let service quality erode in order to cut costs and keep higher profits under price caps. The Tele-Communications Association, Inc. (TCA) and the International Communications Association filed documents with the FCC last week outlining new reporting requirements they say are needed. TCA has expressed concerns that current service reports are nonuniform, too highly aggregated and lack teeth. The group asked the FCC to require the local carriers to publish the standards on which their service reports are based. Additionally, it said the FCC should mandate carriers to disaggregate report data geographically and by service, and to report data service bit error rates.

ICA said new technologies are widely implemented and service quality standards should be raised. It asked the FCC to set standards that will automatically be raised as new technology spreads. The user group also called for stricter reporting rules for data services and asked the FCC to impose criminal penalties on carriers that misreport or falsify reports. ◪

LEC price caps call for little change

First proposed local exchange carrier rate changes under price cap legislation

Carrier	Rate change (in millions of dollars)	Percentage change
Ameritech	-$16.2	-0.72%
Bell Atlantic Corp.	-26.3	-0.97
BellSouth Corp.	5.8	0.22
Contel Corp.	-3.2	-0.82
General Telephone	-26.3	-1.33
Nynex Corp.	-15.9	-0.54
Pacific Telesis Group	-1.3	-1.26
Southwestern Bell Corp.	-5.6	-0.34
United Telephone Co.	-5.3	-0.96
US West, Inc.	-42.0	-2.20

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: *NETWORK WORLD*

FCC leaves LEC price cap plan unscathed

Agency answers request to review effect of price caps on users by making only small alterations.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Despite past user criticism and a belief among user groups that there is mounting evidence showing consumers will be hurt by price caps, the FCC last week upheld all of the major provisions of price cap regulation for local carriers.

The modifications ordered were minor adjustments to the way some economic variables are handled in the price cap formula and should result in customer savings of $356 million during the first year of price cap regulation, according to Federal Communications Commission Chairman Alfred Sikes.

The modifications were ordered last week as the result of a challenge to the FCC's initial decision to implement price caps for the local exchange carriers.

About 30 parties — including the Ad Hoc Telecommunications Users Committee, the International Communications Association, the Tele-Communications Association, Inc., long-distance carriers and state regulators — filed petitions last November asking the FCC to reconsider its decision. However, the agency did not act on that request until last week.

Numerous user groups have complained that the FCC's decision to move forward with price cap regulation for the local carriers will be a consumer disaster. They say the new regulatory scheme gives carriers too much pricing flexibility and could result in reduced user savings and an erosion of service quality.

The FCC's price cap plan, which takes effect July 1, will regulate the rates local carriers can charge for services, rather than the profit level they can achieve, which was the previous method of regulating prices.

Local exchange carrier services affected by the price cap plan include switched and special access services, carrier and residential line charges, as well as operator services. Intrastate local services do not fall under the FCC's jurisdiction.

User groups have complained price caps for local carriers will be a consumer disaster.

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A group of 36 users last year filed an eleventh hour group petition urging the FCC to hold off on price caps until it could be sure users would benefit from them. That petition tried unsuccessfully to prevent the FCC from moving forward with the first phase of tariff filings, which are necessary to implement price cap regulation.

A second round of tariffs, filed earlier this month, proposed rate reductions significantly less than carriers had asked for during previous years under rate-of-return regulation ("Users criticize LECs' first rate reductions under price cap plan," *NW*, April 8).

(continued on page 12)

Octel introduces adjunct unit for voice processing

By Bob Wallace
Senior Editor

MILPITAS, Calif. — Octel Communications Corp. recently introduced a voice response adjunct processor for its voice processing system and four new applications for the unit.

Once attached to existing Octel voice processing systems, the 500D Data Module adjunct will enable callers to use their phone keypads as if they were terminals to interact with computers.

The new applications will enable users to call into hosts and find out if they have text messages waiting for them on remote electronic mail systems. It will also let them access audiotex reports or have the adjunct forward textual information by sending it to a nearby facsimile machine.

The module can be linked to any of Octel's Aspen line of voice processing systems, ranging from the low-end Aspen Branch to the high-end Aspen Maxum Super-System. The voice processing system must be running the company's new Software Release 1, which supports the new software programs and new system administration software.

The 500D Data Module is a specially configured Intel Corp. 80386-based computer that runs Unix and has four card slots that can be used to configure the unit for different uses.

The company offers an I/O card that enables it to emulate a 3270 terminal for communications with IBM hosts, a fax I/O card and an audiotex I/O card. In the future, Octel plans to offer an Ethernet local-area network I/O interface.

Octel introduced four applications for the 500D Data Module and also unveiled streamlined system administration tools for users managing large systems with frequently changing user populations, for example, places such as colleges and universities.

The four new programs are:

- **Octel TransAct**, an interactive voice response application that enables users to access host computers using their telephones as terminals. The package doubles as a DOS-based application generator that allows users to create their own voice response applications on an IBM Personal Computer or compatible.
- **Octel FaxCall**, which lets users store information such as price lists and business forms on the data module and enables callers to use their push-button telephones to request the information to be faxed to them.
- **Octel InfoTex**, an application that enables users to load prepackaged information from information services onto their voice processing systems and make it available to callers. The information could concern business, financial or general news, as well as weather, traffic and other information.
- **Octel InterMail**, which provides users with two-way message notification between the Octel voice mail application and IBM's Professional Office System (PROFS) E-mail system, eliminating the need for callers to separately check both voice and E-mail systems for messages. The system will not, however, enable callers to retrieve those messages. Future releases of InterMail will support links to Digital Equipment Corp.'s All-In-1.

Octel also introduced Centralized Server Administration (CSA), a system administration software package that runs on the data module and is designed for large users. The software will enable multiple system managers to work simultaneously on one or several Octel voice processing systems, creating and deleting large blocks of mailboxes with simple commands.

The 500D Data Module costs $15,000 and is scheduled to be available next month.

Octel TransAct costs $30,000 and should be available in September, Octel FaxCall costs $15,000 and should be available in July, and Octel InfoTex costs $20,000 and is expected to be available next month.

Octel InterMail for IBM PROFS costs $15,000 and should be available next month, while Octel InterMail for DEC's All-In-1 costs $17,000 and is scheduled for release in November. Octel CSA costs $15,000 and should be available next month.

> The new applications will enable users to call into hosts and find out if they have text messages waiting for them on remote electronic mail systems or to access audiotex reports.

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VSAT firms shrink gear

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("Downsized VSAT suited for low traffic at remote sites," *NW*, Jan. 28).

Jim MacDonald, vice-president of network services at GTE Spacenet, acknowledged that the earlier low-end VSAT announcements made by Hughes and Scientific-Atlanta "really take the first step" in meeting users' needs for lower priced VSAT networks.

But, he said, GTE Spacenet plans to focus on lowering installation charges and other related issues to make its forthcoming low-end VSATs attractive.

"As a general trend in the marketplace, there is pressure on all service providers and manufacturers to provide more functionality at a better price," he said. "Installation charges can be a significant part of the overall cost."

New technology

According to MacDonald, GTE Spacenet would have rolled out submeter antenna VSATs last year if it could have but improvements in the manufacturing process to build such products have only been made recently.

Carol Politi, a marketing specialist at Hughes Network Systems, said the rollout of low-cost VSATs and hubs is a natural evolution of the market.

"In the early '80s, the initial VSAT customers emerged. Then vendors and users sat around for a few years to see how they worked," Politi said. "Now that VSATs have been accepted by users, vendors have started investing more money into adding new features and coming up with ways to expand the number of VSATs being used."

Philip Arst, president of Communication Strategies Associates, Inc., a Cupertino, Calif.-based consultancy that specializes in VSATs, applauded vendor efforts to lower VSAT network costs.

But Arst warned users that "you get what you pay for" and that "the low-cost units tend to provide a lower level of performance" than full-sized VSAT offerings.

> GTE Spacenet plans to focus on lowering installation charges and other related issues.

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FCC leaves price caps unscathed

continued from page 11

The seven regional Bell holding companies, plus five independent carriers, asked the FCC for less than $177 million in reductions in their price cap filings. During the past three years, the RBHCs alone have proposed between $400 million and $500 million in reductions and were actually ordered to cut rates by about $1 billion.

The modifications ordered last week dealt primarily with the way local carriers must handle calculations for some types of taxes and other items under the price cap formula.

The major provisions of the price cap plan were kept intact. For example, the FCC stood by its earlier assessment that carriers should be allowed to choose either a 3.3% or 4.3% productivity factor. That factor, which is part of the price cap formula, is designed to ensure that the carriers increase their productivity and, theoretically, cut costs each year by a set amount.

Consumer groups say the carriers are capable of increasing their productivity much more than required under price caps, so users will not get savings as large as they would have under the rate of return.

The FCC also stood firm on other major aspects of the price cap plan, such as the formula used to calculate rates in the common-line service category. It also left intact the initial method proposed for handling complaints about the new regulatory scheme.

The FCC said the local carriers would have plenty of time to amend their price cap filings before the new regulatory system takes effect July 1.

Phase of ISDN trial completed

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SS7 interoperability for ISDN voice communications between AT&T 5ESS switches and Northern Telecom DMS-100 and DMS-250 switches on an inter-local access and transport area basis with MCI as the interexchange carrier.

"When the trial wraps up, we will have proven that the carriers of New York state can negotiate, provision, maintain and implement a standard Signaling System 7 network to support ISDN services," said Colin Beasley, a staff director for New York Telephone and the ISDN trial coordinator. "What this trial has done is create a framework for those negotiations to happen. Then it will just be a matter of where do we next deploy [SS7]."

Beasley said it is wrong to blame the local exchange carriers for the slow deployment of nationwide SS7 and ISDN. The widespread availability of advanced network technologies has been hampered mainly by a lack of compatible switching equipment from different vendors — the issue to be addressed in the third phase of the ISDN trial.

John Lane, executive vice-president and director of communications for Shearson Lehman Brothers, said the trial will give his company an opportunity to measure the practicality of using ISDN. Shearson Lehman Brothers is in the midst of hooking up branch offices with its headquarters via ISDN to enable analysts and brokers to talk on the phone while also sharing computer screens with one another.

"There is the potential for cost savings and upgrading bandwidth quickly with ISDN" that could not be had with traditional leased lines, he said.

> Beasley said it is wrong to blame the local carriers for the slow deployment of ISDN.

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Carrier Watch

continued from page 11

Group said sales of network switching and transmission systems increased 7.7%, from $6.782 billion in 1989 to $7.303 billion in 1990. The group manufactures and markets call switching and transmission equipment, fiber-optic and copper cable, operations support systems and cellular systems for mobile phone networks.

AT&T said sales abroad increased 40% in 1990, with its factories in the Netherlands, Taiwan, Korea and the U.S. delivering more than one million lines of 5ESS switching equipment to Europe and Asia.

Overall, AT&T shipped more than five million lines of digital central office switching equipment.

Significant international sales included contracts worth more than $1 billion for 5ESS switches in Armenia, Aruba, Egypt, Indonesia, the Netherlands, Poland, Singapore, Spain and Taiwan; $70 million for cellular equipment in Korea and the Philippines; and $130 million from Telefonos de Mexico S.A. de C.V. for fiber-optic cable and transmission equipment.

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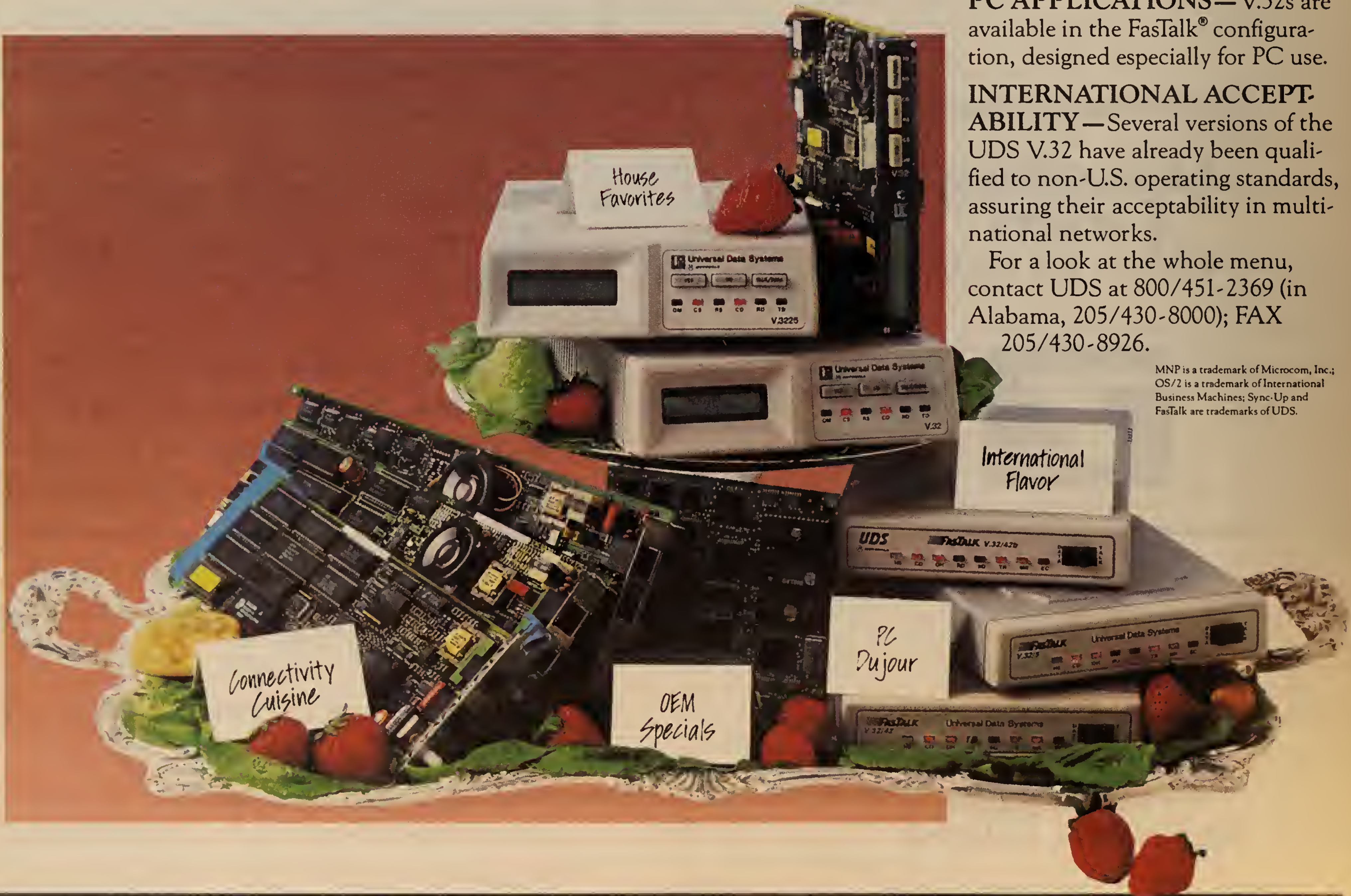

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

> "When we say 'open systems network,' we're not just talking about building links between Unix systems. We're talking about creating links between Unix systems and our own [and other] vendors' proprietary systems."
>
> **Carl Masi**
> Vice-president
> Corporate marketing
> Unisys Corp.
> Blue Bell, Pa.

Data Packets

Make Systems, Inc. of Mountain View, Calif., last week announced a new module for its Netool network design software, as well as Release 2.5 of the software, which adds support for the latest products from Network Equipment Technologies, Inc. (NET), Newbridge Networks, Inc. and Timeplex, Inc.

The new module supports the design and simulation of European T-1, 56K and 64K bit/sec, and fractional E-1 trunks. It also allows for mixed networks with both North American and international trunks.

The module also determines the costs for international links based on inter- and intracountry tariffs.

Netool's device library is expanded with Release 2.5 to include products such as NET's Release 10.01 for the IDNX 20, 40 and 70 multiplexers, Newbridge's MainStreet 3612 feeder multiplexer, an improved topology design for Timeplex Link/100+ multiplexers and a link to Timeplex's Time/View 2000 network management system for downloading network information to Netool.

Netool Release 2.5 is available now from Make Systems, Newbridge and Timeplex. Pricing is based on network size and selected features.

Software allows Wellfleet routers to link to SMDS net

Pack lets routers pass packets to DSU/CSU.

By Paul Desmond
Senior Editor

BEDFORD, Mass. — Wellfleet Communications, Inc. and Digital Link Corp. last week announced new software that lets a Wellfleet router use a Digital Link data service unit/channel service unit (DSU/CSU) to connect to a Switched Multimegabit Data Service (SMDS) network.

Wellfleet's new SMDS Software lets Wellfleet routers package local-area network packets into an SMDS-compatible format and hand them off to a Digital Link DSU/CSU. Digital Link's new DL200 DSU/CSU, which is an SMDS-compatible version of its existing DL100, will format the packets as required to ship them over a T-1 line.

> Digital Link's new DL200 DSU/CSU will format the packets as required.
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> ▲▲▲

SMDS support in Digital Link's DL3000 Digital Service Multiplexer, a combined DSU/CSU and multiplexer for T-3 links, is planned for next year.

Wellfleet, based here, and Digital Link, based in Sunnyvale, Calif., have made public the specifications for their SMDS Data Exchange Interface. They have also submitted the specifications to the recently formed SMDS Interest Group for consideration as a standard.

That proposal is based on the way Wellfleet and Digital Link have adapted the Bell Communications Research SMDS specification for use in their products, said Dan Palmer, vice-president of engineering at Digital Link.

According to the Bellcore Technical Advisory (TA) on SMDS, there are two basic steps for forming data into SMDS-compatible packets, called cells.

The first is to package the data into variable-length packets dubbed SMDS Level 3 Protocol Data Units (L3PDU), which can be as many as 9K bytes in length, said David Yates, senior product manager at Wellfleet. The L3PDU maps the addressing scheme used by the router into E.164, which is an Integrated Services Digital Network addressing format used in SMDS nets.

Next, the L3PDU packets must be broken down into 48-byte increments and packaged with a five-byte header to form 53-byte cells called L2PDUs, Yates said.

The Bellcore TA assumes that one piece of equipment performs both of those functions, Palmer said. But routers and bridges typically use DSU/CSUs to ship data out to T-1 or T-3 lines.

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IBM EDI software to run in near real-time mode

By Paul Desmond
Senior Editor

TAMPA, Fla. — IBM recently announced new electronic data interchange software for its MVS systems that provides near real-time transfer of messages compared with its previous batch mode products.

"People are starting to realize that batch processing really doesn't cover the needs of American business today," said Jim Crouse, an EDI consultant in IBM's EDI solution center here.

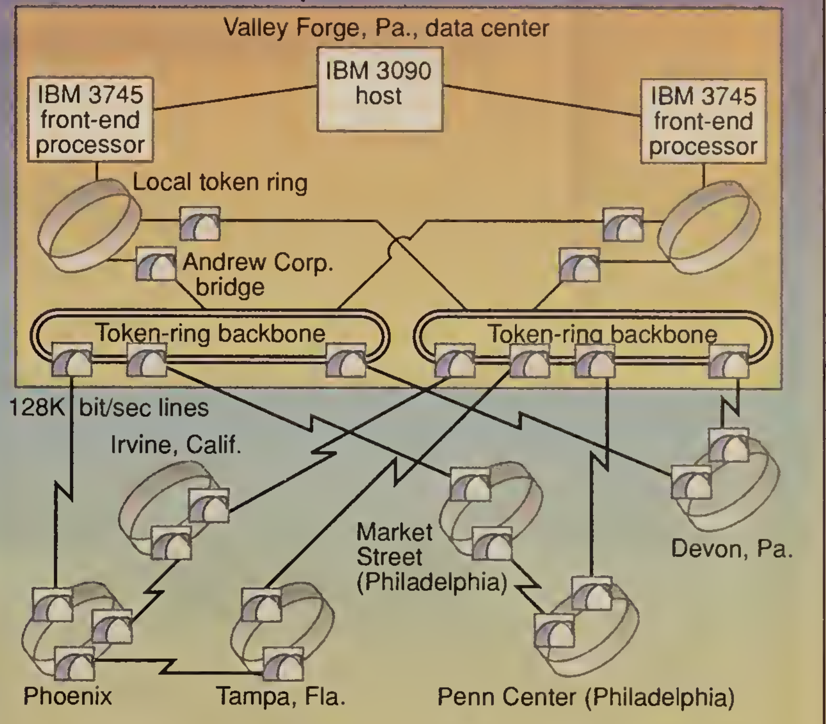
The new software, DataInterchange/MVS-CICS, is an LU 6.2-based application that can work in conjunction with the IBM Information Network (IIN) — or any other public net that can support LU 6.2 traffic — to quickly forward messages to a user's trading partner.

DataInterchange/MVS-CICS supports the same features as IBM DataInterchange/MVS Release 3, which is a batch mode product IBM also announced recently. Both products support the translation of messages from various applications into industry-standard EDI formats such as ANSI X12 and the United Nation's EDI for Administration, Commerce and Transport (EDIFACT).

Release 3 expands the locations that can be reached via the IIN as compared with previous releases. The IIN is logically sepa-

(continued on page 18)

Colonial Penn phases out remote FEPs



Colonial Penn Group is phasing out remote front-end processors by bridging LAN-attached cluster controllers directly to the company's Valley Forge data center.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: COLONIAL PENN GROUP, INC., PHILADELPHIA

User dumps remote FEPs for LAN setup

Colonial Penn axes remote FEPs from net in favor of bridged token rings, improved reponse time.

By Jim Brown
Senior Editor

VALLEY FORGE, Pa. — Colonial Penn Group, Inc. is installing a nationwide net of interconnected token-ring local-area networks that will significantly improve terminal response time and provide personal computer users with peer links to one another.

By moving to a series of bridged token rings, Colonial Penn can devise such strategic LAN-based applications as processing images of paper claim forms. The insurer will also gain centralized management control over remote LANs.

"We're really putting a network architecture in place that will enable us to exploit new application possibilities in the future," said Steve Clevenger, vice-president of data operations.

The move is a shift away from a traditional IBM Systems Network Architecture net, in which remote front-end processors pass all terminal traffic to host processors in the company's data center here.

The new network, however, will enable remote IBM 3191 terminals attached to IBM 3174 cluster controllers on a 16M bit/sec token-ring LAN to access claims processing, policy holder services and telemarketing applications residing on an IBM 3090 mainframe here. The LAN-attached 3174s are linked via Andrew Corp. bridges to 128K bit/sec AT&T Accunet Spectrum of Digital Services (ASDS) fractional T-1 circuits that connect to one of two IBM 3745 front-end processors here that are linked to the host.

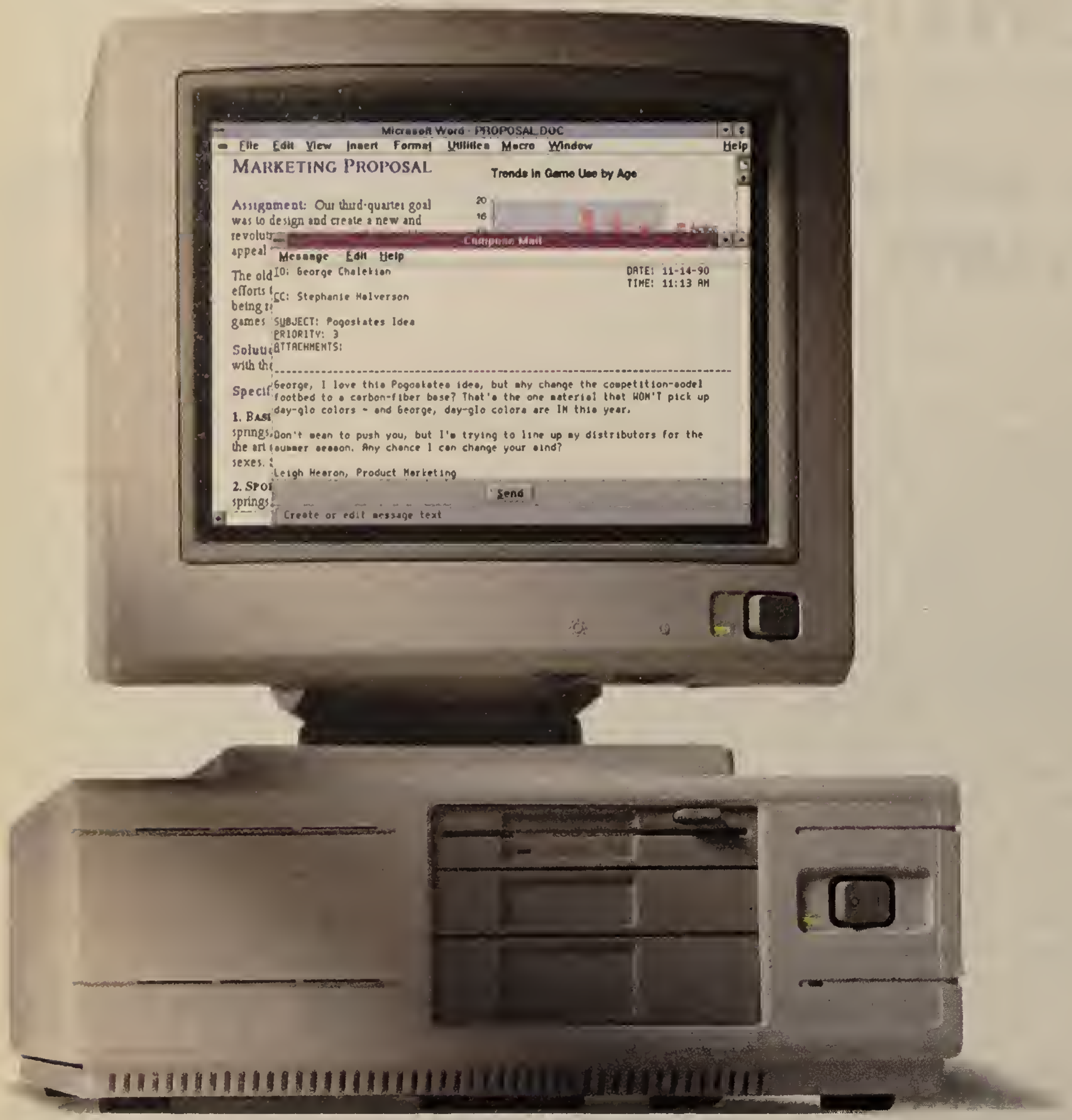
Additionally, microcomputers attached to 4M bit/sec departmental token rings running Novell, Inc.'s NetWare 386 will be bridged into the 16M bit/sec token ring at each site. That will enable microcomputers at one location to communicate with microcomputers at another on a peer basis.

> At the data center, two backbones will provide redundant paths to the host.
>
> ▲▲▲

At the data center, two token-ring backbones will provide redundant paths to the host. In addition, redundancy is built into remote sites, where token rings will be equipped with two bridges.

One bridge will pass terminal traffic to a backbone in the data center, while the other will pass traffic to at least one other site

(continued on page 18)


Microsoft Word - PROPOSAL.DOC
File Edit View Insert Format Utilities Macro Window Help
MARKETING PROPOSAL
Trends in Game Use by Age
Compose Mail
Message Edit Help
Send

TO: George Chalekian
CC: Stephanie Halverson
SUBJECT: Pogoskates Idea
PRIORITY: 3
ATTACHMENTS:

DATE: 11-14-90
TIME: 11:13 AM

George, I love this Pogoskates idea, but why change the competition-model footbed to a carbon-fiber base? That's the one material that WON'T pick up day-glo colors - and George, day-glo colors are IN this year.

Don't mean to push you, but I'm trying to line up my distributors for the summer season. Any chance I can change your mind?

Leigh Hearon, Product Marketing

Create or edit message text

Now anyone can g
what kind of b

Microsoft Mail works across all networks.

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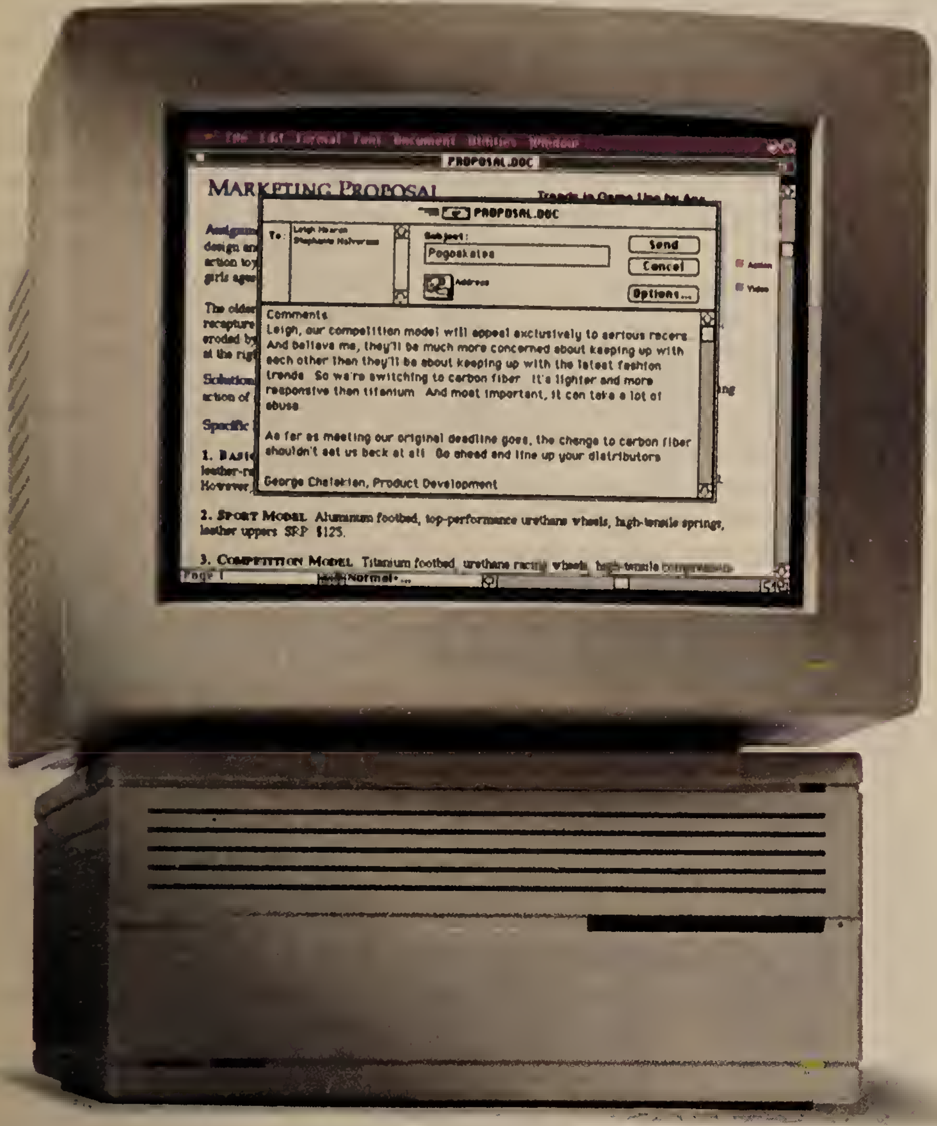


MARKETING PROPOSAL

To: Leigh Hearon
Stephanie Halverson

Subject: Pogoskates

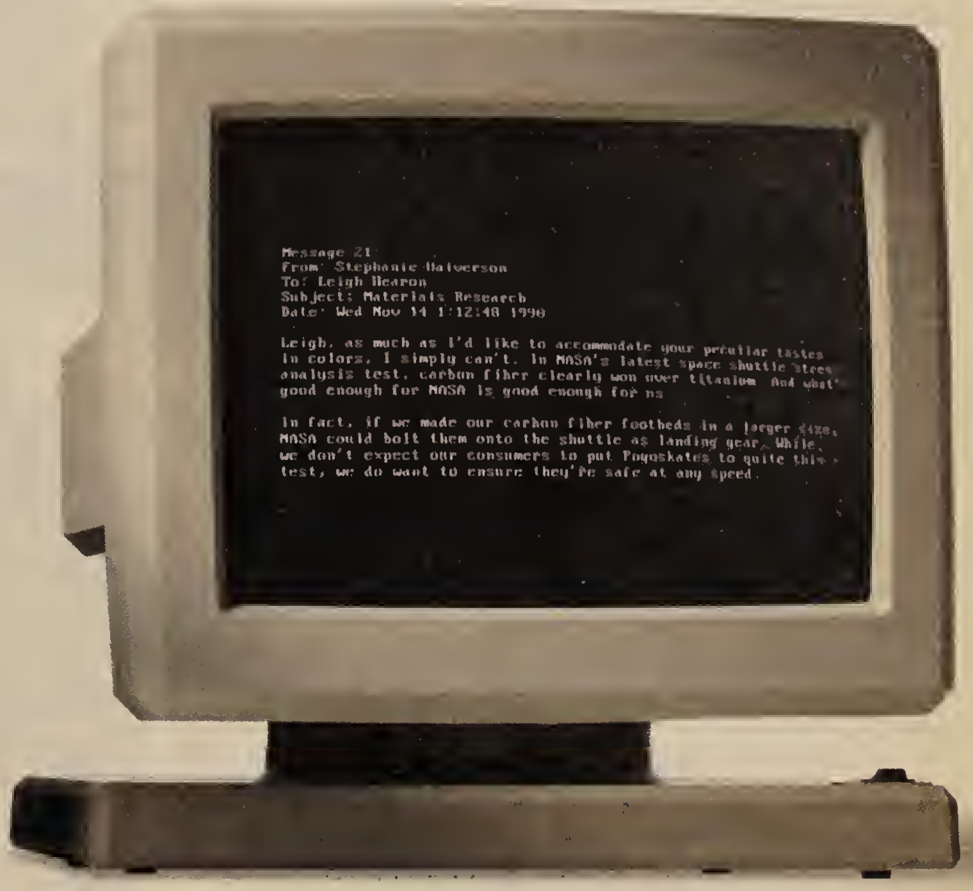
Comments
Leigh, our competition model will appeal exclusively to serious racers. And believe me, they'll be much more concerned about keeping up with each other than they'll be about keeping up with the latest fashion trends. So we're switching to carbon fiber. It's lighter and more responsive than titanium. And most important, it can take a lot of abuse.

As far as meeting our original deadline goes, the change to carbon fiber shouldn't set us back at all. Go ahead and line up your distributors.

George Chelekian, Product Development

2. SPORT MODEL Aluminum footbed, top-performance urethane wheels, high-tensile springs, leather uppers. SRP $125.

3. COMPETITION MODEL Titanium footbed, urethane racing wheels, high-tensile compression



```
Message 21
From: Stephanie Halverson
To: Leigh Hearon
Subject: Materials Research
Date: Wed Nov 14 1:12:48 1990

Leigh, as much as I'd like to accommodate your peculiar tastes
in colors, I simply can't. In NASA's latest space shuttle stres
analysis test, carbon fiber clearly won over titanium. And what'
good enough for NASA is good enough for us

In fact, if we made our carbon fiber footbeds in a larger size,
NASA could bolt them onto the shuttle as landing gear. While
we don't expect our consumers to put Pogoskates to quite this
test, we do want to ensure they're safe at any speed.
```

et mail, no matter ox they have.

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Mich. state net to boost child support collections

By **Maureen Molloy**
Staff Writer

LANSING, Mich. — The Michigan Supreme Court is currently installing a statewide net that will enable child welfare agents to track down the 85% of eligible parents who default on child support payments each year.

The net is expected to bring an exponential increase in child support collections by allowing welfare agents to quickly locate parents who skipped out on the payments. It also allows them to work with other state and federal agencies to legally attach the offender's paycheck in order to resume child support payments.

In addition to linking various child welfare offices statewide, the network will provide agents with access to networks run by the Department of Social Services, the Department of Social Security, the state police and the Internal Revenue Service in order to locate parents who fail to make child support payments.

The court is outfitting each of the state's 55 Friend of the Court (FOC) offices with Digital Equipment Corp. DECnet local-area networks that provide attached workstations with access to a centralized data base here of every child support case in the state.

In the event a parent moves and leaves no forwarding address, agents can use their links to external networks to track the parent's location and then forward the file to the correct FOC office, where local agents will contact the parent.

"Before, data bases weren't shared among offices so you had to rely almost entirely on the honesty of the person who owed money — which doesn't work," said Ron Herrmann, Telecommunications Coordinator of the Child Support Enforcement System (CSES) project. He pointed to a lack of computerization and networks in FOC offices as a key cause for the large number of child support cases remaining in arrears.

Under the old system, each FOC site had an autonomous data base of child support court orders in its county. Because data bases were not shared among offices, inquiries about accounts or court files between sites were handled by correspondence or by phone.

The current project is part of a federal government program aimed at helping states collect outstanding child support payments. The federal government is paying 90% of the installation cost of the statewide CSES network, which includes a centralized mainframe that maintains a Client Information Service (CIS) data base of all child support cases.

The new network consists of a T-1 backbone that links the central site here to Timeplex, Inc. multiplexers at nine hubs in major cities and remote FOC facilities. A VAX 3400 minicomputer at each of the FOC offices acts as a file server and is connected to an Ethernet network linking personal computers at each office. Smaller FOC sites are linked into the nearest city hub via a 56K bit/sec circuit, where case file data is then routed back to the central site (see graphic, this page).

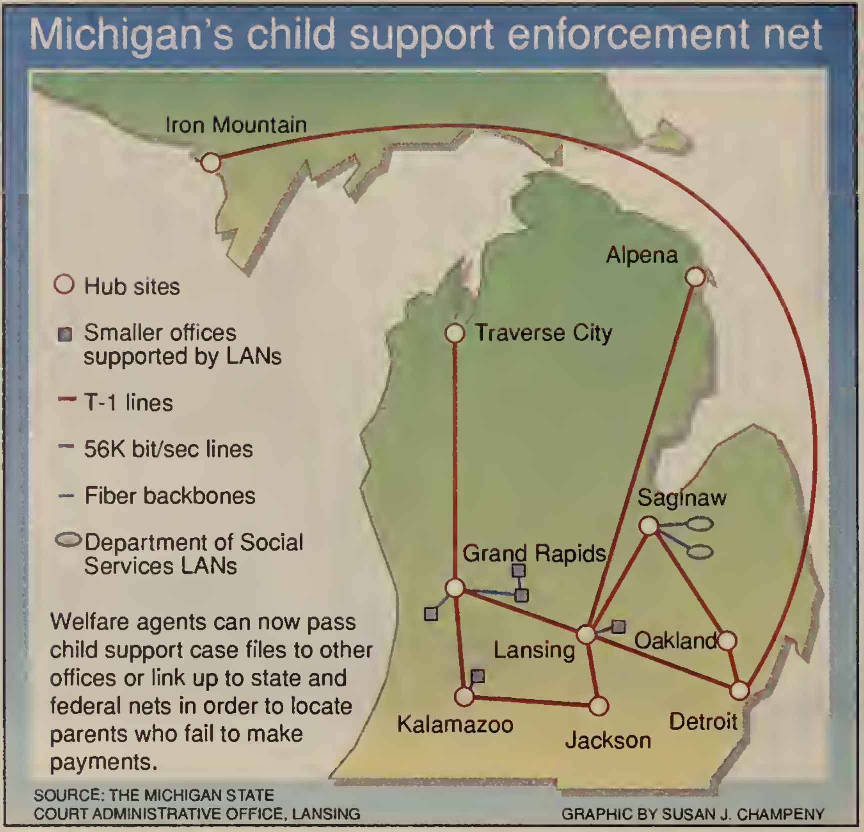
A cluster of four DEC 6322 VAXes house the CIS data base, which is located at the CSES central site here. Changes made on any individual FOC data base are automatically uploaded to the CIS data base.

Part of the application also speeds the process by performing electronic calculations to determine the amount of support owed. Previously, agents took the appropriate factors into account and manually calculated the amount of support a client owed.

Herrmann said the CSES project has brought automation to many of the smaller FOC offices, where work was previously done entirely manually.

"CSES is especially significant for some offices because, not only will they have access to a statewide data base, but [they will also be brought] into the modern age of personal computers," he said.

Michigan's child support enforcement net



Welfare agents can now pass child support case files to other offices or link up to state and federal nets in order to locate parents who fail to make payments.

SOURCE: THE MICHIGAN STATE COURT ADMINISTRATIVE OFFICE, LANSING

GRAPHIC BY SUSAN J. CHAMPENEY

Software allows routers to link

continued from page 15

"We defined an artificial split in the Bellcore TAs for customer premises access to SMDS, and that split is between the L3PDU and the L2PDU," he said.

Wellfleet's new SMDS Software will convert data coming from LANs into the L3PDU format. It will then use a V.35 physical interface and the High-Level Data Link Control protocol to ship the data to the Digital Link DSU/CSU, Yates said.

The Digital Link DSU/CSU will then perform the conversion to the L2PDU and ship the data out over a T-1 or T-3 link.

The Wellfleet/Digital Link announcement follows two similar announcements last month by Cisco Systems, Inc. Cisco announced a T-1 SMDS interface, scheduled for June delivery, which it developed with ADC/Kentrox Industries, Inc., as well as a T-3 SMDS link developed with NEC America, Inc. that is due in the fourth quarter of this year.

Ed Kozel, director of business development at Cisco, said it is premature to be promoting such an interface standard because work remains to define a management interface that would let the router garner line quality data from the DSU/CSU.

"The standard proposed by Wellfleet and Digital Link is before its time," Kozel said. "It does not provide this type of information or functionality."

Cisco is preparing its own interface specification, which will address the management issue, and plans to present it to the SMDS Interest Group within the next two months, he said.

Field trials for the SMDS Data Exchange Interface are scheduled for this summer. Wellfleet's SMDS Software is expected to be available in the second half of this year on new routers and as an upgrade to existing Wellfleet routers for about $1,500. Digital Link's DL200 is also expected to be available in the second quarter and is priced between $5,000 and $6,000.

Software to run near real time

continued from page 15

rated into various regions, such as North America and Europe. Previously, a user in one region could not use the DataInterchange/MVS product to send an EDI message to a user in another, but Release 3 expands the addressing to support the transfer of messages between regions, Crouse said.

Release 3 also supports a new Transaction Store and Delayed Enveloping Facility that allows multiple transmissions going to the same destination to be stored, analyzed, corrected if necessary and grouped together before being transmitted. It is intended to decrease line costs as compared with sending each transaction individually.

IBM also beefed up the security features of its EDI software with support for the ANSI X12.58 standard for transaction authentication and confidentiality. One feature of the new security measures is the ability to encrypt only the most sensitive data.

For example, a user could opt to encrypt payment transactions to banks but not the remittance advice data that describes what the payment is for. That differs from link encryptors that encode everything on a line, which causes more overhead and can be cumbersome to decode.

Both products are scheduled to ship in July. DataInterchange/MVS-CICS ranges in price from $20,170 to $86,580, plus annual fees ranging from $2,945 to $11,800. DataInterchange/MVS Release 3 ranges in price from $15,340 to $62,740, with annual fees of between $2,130 and $8,550.

User dumps FEPs for LAN

continued from page 15

also connected to the data center. When a remote bridge fails, the backup can reroute traffic via an alternate route (see graphic, page 15).

Currently, Colonial Penn links 3174s supporting 3191 terminals at remote sites to local 3720 front-end processors, which in turn are linked to the data center via 56K bit/sec ASDS circuits.

Improved response time

Clevenger said a model of the network developed at IBM facilities in Raleigh, N.C., demonstrated that by interconnecting LANs over 128K bit/sec fractional T-1 lines, the firm could cut terminal response time from an average of 1.5 seconds using the 3720s to an average of 0.9 seconds.

Although such a gain may seem minute to some, Colonial Penn officials said the real benefit comes during peak traffic loads on the net.

The model showed that the LAN internetwork will support response time of just over one second during peak traffic periods, while the current 3720 setup supported terminal response time of almost three seconds under peak loads.

Colonial Penn began installing the LAN internetwork last year and now faces the task of outfitting the 3174s at each location with IBM Token-Ring Interface Couplers (TIC). These TICs attach 3174s to IBM 8230 media access units, which provide access to a 16M bit/sec token-ring network at each location.

The first site to be linked to the interconnected token-ring network was Colonial Penn's office in Devon, Pa. Offices in two Philadelphia buildings will join the internetwork by June, while sites in Phoenix, Tampa, Fla., and Irvine, Calif., will join the internetwork by year end.

The move to a bridged token-ring network will enable Colonial Penn to cancel its leases on the 3720s and avoid license fees for the Network Control Program software running on them.

The bridged LANs will also enable Colonial Penn to swap out leases for powerful 3745 Model 410 front-end processors at the data center in favor of smaller 3745 Model 150s outfitted with a TIC that supports all remote sites.

While the savings from reduced hardware leases and software license costs are offset by the expense of buying new token-ring hardware, the move to a bridged environment gives Colonial Penn greater flexibility.

The move will enable Colonial Penn to cancel its leases on the 3720s and avoid license fees for the NCP software running on them.

▲▲▲

"There will be more capability out there because we'll be able to have a LAN in our Phoenix location talking to a LAN at our Tampa site" on a peer-to-peer basis without host intervention, Clevenger said. Currently, a terminal at one site sending a message to a terminal at another must do so by routing it though the host.

Colonial Penn also uses IBM's LAN Network Manager software to centrally monitor and control the token ring in Devon. The software will be used to monitor and control other token rings as they are installed, said Harry Ryan, the company's technical director of data communications.

Screaming 1-year-old rattles industry.

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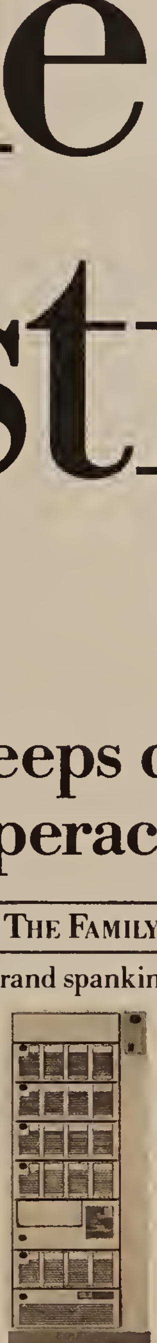

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*SPECmark is a geometric mean of the ten SPECmark tests. MFLOPS are LINPACK double precision where n=100. AIX XL FORTRAN Version 2.1 and AIX XL C Version 1.1 compilers were used for these tests.

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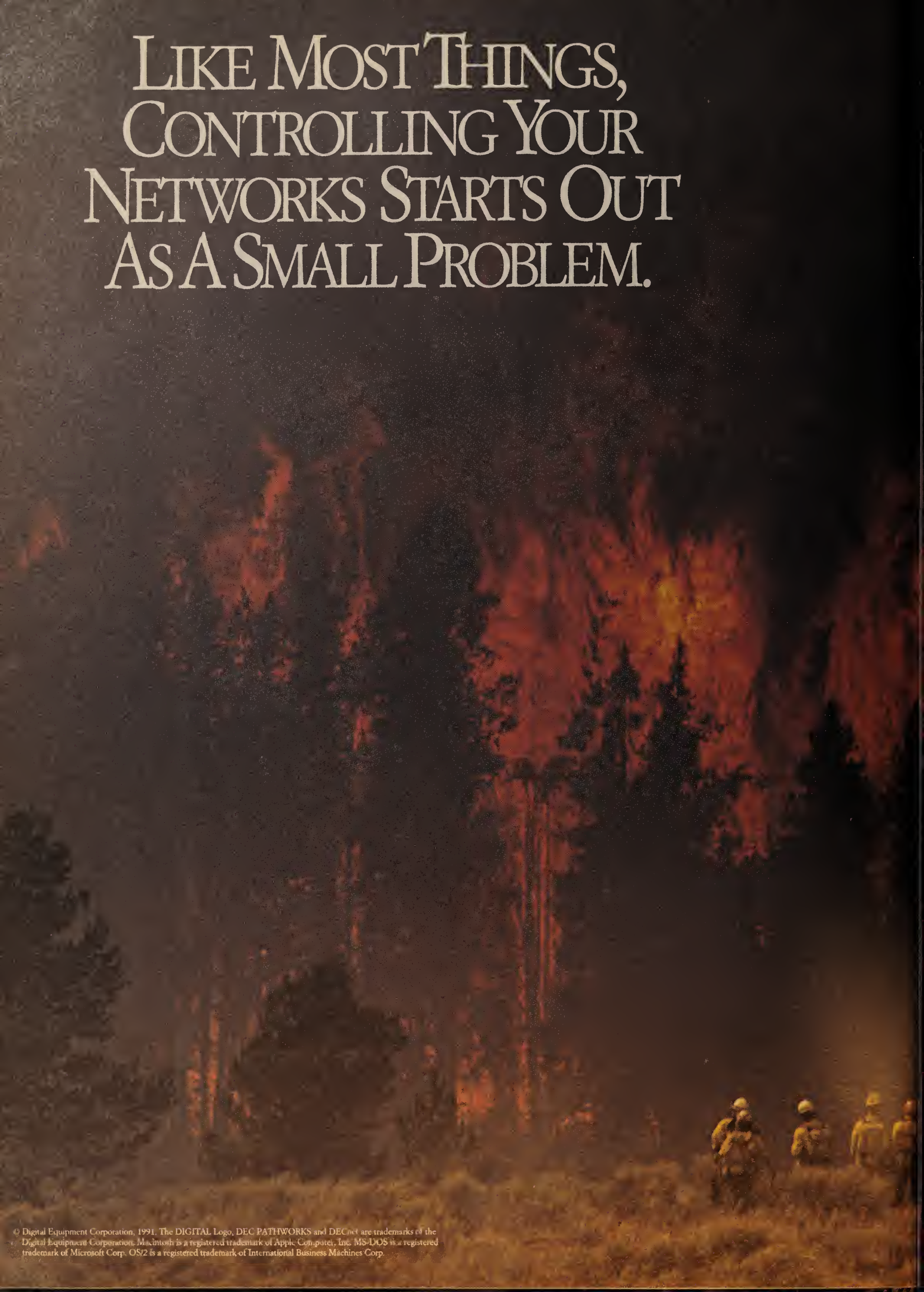
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Of course, the HP EtherTwist Hub supports 10Base-T, and is compatible with Novell and LAN Manager. So call **1-800-752-0900, Ext. 2006** for more information on the HP EtherTwist LAN. You'll see how HP has turned a difficult choice into a very easy one.

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>
> **Dave DePuy**
> Director of marketing
> 3Com's Network Adapter Division
> Santa Clara, Calif.

Netnotes

Cayman Systems, Inc. of Cambridge, Mass., this week will release the next generation of its GatorBox AppleTalk-to-Ethernet gateway.

GatorBox CS, which is available as a stand-alone gateway or as a module for Cabletron Systems, Inc.'s Multi Media Access Center hub, has been redesigned as a single-board product.

GatorBox CS is an application-level gateway that ties Apple Computer, Inc. AppleTalk networks to Ethernet networks, providing print sharing and file sharing via the Network File System.

The new version of the gateway includes 2M bytes of memory, 1M byte of which is flash erasable programmable read-only memory.

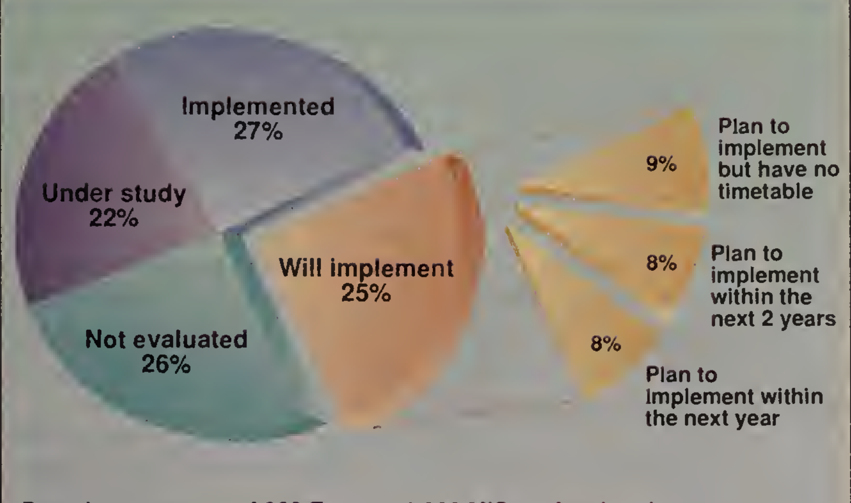
Also new with GatorBox CS is GatorKeeper software, which monitors multiple GatorBox CS gateways on the network. GatorBox CS costs $2,795.

Banyan Systems, Inc. and **FTP Software, Inc.** recently announced a marketing agreement under which the two companies will sell both FTP's Transmission Control Protocol/Internet Protocol and Banyan's VINES software for OS/2 computers.

FTP's PC/TCP for OS/2 and Banyan's VINES Version 4.10 can be used together to provide more complete OS/2 networking, according to FTP officials. Banyan will also re-

(continued on page 24)

Client/server implementation plans



Based on a survey of 208 Fortune 1,000 MIS professionals.

GRAPHIC BY SUSAN SLATER SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

DCA introduces token-ring interface for Macintoshes

Card works with IBM mainframe link products.

By Caryn Gillooly
Senior Editor

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) last week introduced a token-ring adapter card that gives Apple Computer, Inc. Macintoshes access to IBM mainframes over a local-area network.

DCA's MacIRMAtrac Token-Ring card is designed to link Macintosh II personal computers into a 4M bit/sec token-ring LAN. The network must support AppleTalk networking protocols or use an operating system that supports the protocols, such as Novell, Inc.'s NetWare.

Macintoshes equipped with the new adapter and DCA client software will be able to access a mainframe through a single, LAN-attached personal computer equipped with a gateway.

Previously, each Macintosh had to support a gateway and a coaxial-cable connection to a cluster controller providing access to the mainframe.

> The Token-Ring card supports 4M bit/sec transmission over twisted-pair cabling.
>
> ▲▲▲

The current version of the MacIRMAtrac Token-Ring card supports 4M bit/sec transmission over both shielded and unshielded twisted-pair cabling, according to DCA. But a spokeswoman said users will be able to upgrade the card — to support, for example, 16M bit/sec speed or fiber-optic cabling — by swapping out a single component.

This replaceable Remote Interface Module (RIM) is a smaller board that houses the cabling and token-ring interface attachments. If the user wanted to upgrade, the RIM could be removed and replaced, protecting the initial hardware investment.

> If the user wanted to upgrade, the RIM could be removed and replaced.
>
> ▲▲▲

"This gives the user a lot more flexibility," said Lisa Hammer, product manager for the MacIRMAtrac Token-Ring card. "Although today DCA offers a 4M bit/sec module with two types of cable connections, in the future, we plan to add 16M bit/sec support and other types of cabling," such as fiber optics.

Hammer declined to specify a time frame for delivery of those features.

The cost of an upgrade to 16M bit/sec, for example, would be less than $200, according to DCA.

Hammer added that the MacIRMAtrac card supports 128K bytes of random-access memory, which is expandable to 2M bytes.

The MacIRMAtrac Token-Ring card will be available later this month for $795. ◻

Imaging net helps insurer cut red tape

Lincoln National's new image processing system has enabled it to boost productivity, save money.

By Bob Wallace
Senior Editor

FORT WAYNE, Ind. — Lincoln National Corp.'s Employee Benefits Processing division has installed a LAN-based image processing system that increased claims agent productivity by 20% and saved the company more than $1.3 million in 1990.

The insurance firm, which will have invested $5.2 million in imaging wares by midyear, said the technology has helped it to drastically cut back on complaints by improving customer service and accelerating claims processing by agents.

The imaging network has also ushered Lincoln National into the era of paperless claims processing at its home office here.

Network setup

Lincoln National modified a CICS application running on an IBM mainframe to support IBM's ImagePlus software. Users on 268 Personal System/2 Model 55 SXs with IBM 8508 split-screen monitors spread across a dozen 4M bit/sec IBM Token-Ring local-area networks emulate IBM 3270 terminals to request data resident on the mainframe.

The LANs are linked via T-1 lines to a token-ring backbone supporting Lincoln National's mainframes at its data center here. The insurance firm recently began letting agents at remote sites — in Fort Scott, Kan.; Frederick, Md., and Pleasanton, Calif. — access the ImagePlus mainframe-based server to process claims.

Hank Dill, assistant vice-president of image technology at Lincoln National, said the imaging application has improved customer service and stemmed the loss of customers to rivals.

"We know we lost business due to poor customer service because we monitor our claims system and receive complaints at [Employee Benefits Processing] offices throughout the U.S.," Dill said. "But now we answer claims

(continued on page 24)

Noorda: Complex industry creates strange bedfellows

By Eric Smalley
Senior Editor

ARLINGTON HEIGHTS, Ill. — The computer industry, particularly the networking portion, has become so complex that competitors have been forced into coalitions and strategic relationships with one another, according to Ray Noorda, president of Novell, Inc.

Noorda, whose company has entered into an increasing number of business partnerships with other vendors, gave the keynote speech at the recent Local Area Network Dealers Exposition (LANDEX) held here.

He told attendees to expect more cooperation and association among different vendors. "There's going to be more getting together of companies," he said.

Noorda said the industry is "at an accelerating point" and technology has become too complicated for individual companies — even the largest — to be successful alone. Coalitions and partnerships enable vendors to share technology, as well as improve marketing and support.

Novell's alliance with IBM, announced in February, is an example of how two large vendors have been driven to work together by customer needs, he said. The immediate effect of that alliance is the boost given to Novell by IBM's marketing and distribution power.

A yet-to-be-announced coalition of systems integrators and third-party vendors sponsored by Novell is an example of a coalition formed to improve customer support, according to Noorda.

That coalition is expected to be announced later this month along with Novell's system and network management architecture ("DEC, Novell plot new management courses," *NW*, April 8).

In discussing partnerships, Noorda cited Novell's acquisition earlier this month of a minority share in AT&T's Unix System Labs, the AT&T subsidiary responsible for the development and licensing of Unix System V.

(continued on page 24)

National Fuel Gas migrates SCADA net to LAN platform

New net will offer more functionality than minis.

By Bob Wallace
Senior Editor

BUFFALO, N.Y. — National Fuel Gas Supply Corp. is replacing its minicomputer-based network with local-area networks linked via T-1 lines.

The Supervisory Control and Data Acquisition (SCADA) network, which collects pipeline operations data via satellite, is more reliable, flexible and better suited to handle the firm's fast-growing computing needs than the minicomputer systems it is replacing.

"LANs offer greater functionality, easy expansion and the ability to incorporate new technology, such as machines with faster processors, as it becomes available," said William Gabris, principal engineer with Westin Engineering, Inc., a San Jose, Calif., consultancy that helps companies plan, design and implement SCADA networks.

National Fuel Gas' SCADA network enables the company to better monitor and control distribution, storage and transportation of gas throughout New York and Pennsylvania from its headquarters here.

The new LANs — installed at headquarters and at sites in Erie, Pa., and West Seneca, N.Y., and linked via T-1 Ethernet bridges — have also increased system versatility and reliability, according to James Bogdan, director of SCADA and telemetering for National Fuel Gas.

"The local-area networks are more easily expandable and provide the same, if not more, processing power than the [minicomputers]," Bogdan said. The company will also save money on software, which is typically less expensive for personal computers than for minicomputers.

Further savings — $200,000 to $300,000 a year — will be provided by replacing the expensive multidrop private lines used to carry pipeline data back to its minicomputers, as well as replacing leased lines running from field monitoring devices, with very small aperture terminal satellite links.

Field monitoring devices are file cabinet-sized two-way communications units that control valves, gauges, thermometers and pressure sensing units along the pipeline, and store readings and alarms generated by those devices.

Although the LANs are now up and running, the company has yet to dismantle the old system, choosing instead to run it in tandem in order to provide several levels of redundancy. "In the pipeline industry, when you design a network you want redundancy, redundancy and more redundancy," Bogdan said. "We can't afford to have our network go down."

The old network is based on three minicomputers, a DEC PDP-11/73+ in West Seneca that communicates over two multidrop leased lines with eight RTUs used to control gas dispatching in New York state, and a second DEC minicomputer in Erie that polls 12 field units over two multidrop leased lines. The third system, based here, serves as a backup for the first two and uses dual Texas Instruments, Inc. 960B computers to manage 12 field units over one multidrop line.

The LANs the company has installed are 3Com Corp.'s 3+ Open LAN Manager Ethernets. The nets are driven by four file servers — two located here, one at the West Seneca site and one at the Erie location. The servers are 25-MHz and a 20-MHz 80386-based Compaq Computer Corp. microcomputers running OS/2.

The company's West Seneca and Erie sites are linked to headquarters here using 3Com IB/3 bridges and point-to-point T-1 lines provisioned over a combination of copper, microwave and fiber transmission media.

All inter-LAN traffic, including data, polling, screen updates and files, are sent across the T-1 bridges, while the servers poll data from remote units over the satellite network.

One workstation at each site is configured with 9M bytes of memory — instead of the 5M bytes others have — and has a copy of all the file server software, enabling it to be used as a backup server for the site.

The personal computers and workstations are not dedicated to SCADA operations, Bogdan said. They can be used for other tasks, while the workstations can run any software that runs under OS/2, including spreadsheets, data bases, computer-aided design and word processing programs.

> "The local-area networks are more easily expandable than the [minicomputers]."

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Netnotes

continued from page 23

sell PC/TCP to customers that purchase VINES Version 4.10. PC/TCP for OS/2 costs $575.

The AG Group recently announced EtherPeek 1.3, the latest version of its Apple Computer, Inc. protocol analyzer that includes support for the Simple Network Management Protocol (SNMP) and MacIP protocols.

According to the Walnut Creek, Calif., firm, the new version includes decoders for SNMP and MacIP packet types. MacIP is the protocol used to encapsulate AppleTalk packets for transmission across AppleTalk nets.

By double-clicking on a packet header in the main window display, administrators can see the contents of these packets broken out by protocol layers.

The new version also comes in a modular design, which breaks out hardware interface drivers and packet decoders from the rest of the program.

EtherPeek 1.3 is available now for $695.

Digital Equipment Corp. recently signed a marketing and reseller agreement with Soma, Inc. to offer Soma's DataLens Driver for Digital Networks.

The product allows users of Lotus Development Corp.'s 1-2-3 spreadsheet to access remote DEC Rdb relational data base systems using DEC's SQL/Services software. With DataLens Driver for Digital Networks, 1-2-3 acts as a client application to Rdb servers, allowing 1-2-3 users to query Rdb data bases anywhere on a net of VAX computers.

Creating strange bedfellows

continued from page 23

"We will work with those folks to make those products workable and 'interfaceable,' " he said.

Although Novell is not a member of the Advanced Computing Environment (ACE) coalition announced last week, it has relationships with all of the member companies and will eventually support the platform specified by the group, according to Noorda.

The principal vendors in the ACE consortium are Compaq Computer Corp., Digital Equipment Corp., Microsoft Corp., MIPS Computer Systems, Inc. and The Santa Cruz Operation, Inc. The companies are working to establish a standard software and hardware architecture for workstations.

Imaging net helps insurer

continued from page 23

questions while the customer is on the phone."

Mailroom workers receive about 10,000 envelopes a day, containing an average of five pieces of paper. These documents are scanned into the imaging system and stored on subsystems, such as the direct access storage devices in Lincoln National's data center in Fort Wayne. Claims files are passed to agents at imaging workstations for processing and payment, after which they are filed on optical disks.

When Lincoln National customers call in for claims updates, examiners at imaging workstations key in the caller's group identification number and social security number. The agents then receive an image copy of the claims file and can answer questions while the customer is on the phone, Dill said.

With the new setup, claims are downloaded to examiners, who must either pay them and file the image, reroute it to someone else such as a supervisor for special approval or put the claim on hold for more information.

"They can't pick and choose," Dill said. "They have to deal with them as they come up." Before, agents often processed the easiest claims first, regardless of the order in which they were submitted.

Files that are put on hold pop back into the examiner's queue after a set period of time. If a customer document is scanned into the system, it is added to the file on hold, which is then put in the examiner's active queue, Dill said. "Sometimes, it's the piece of paper the examiner is waiting for," Dill said. "Other times, it's just another claim."

Preimaging

Prior to installing the imaging net, answering customer questions was difficult and sometimes impossible. Claims received by mail were sorted by group number and by the ID number of the examiner assigned to handle them, Dill said. They were manually routed to the examiner and stuffed in his or her cabinet by a support person, whose job it was to dish them out, oldest claims first.

"It was difficult for examiners to answer questions on the phone because they had to go to the file cabinet to locate the correct folder from which to take the [necessary] documentation," Dill said.

When examiners needed additional documentation from the customer to process a claim, the paper claim was relegated to a hold file. The examiner regularly checked the file to see if the required paperwork had arrived, Dill said.

"Although nothing was supposed to stay in a hold file for more than 30 days, some claims did," Dill said. Worse yet, claims that could not be found were deemed lost. "A lost claim could be in any one of 15 different places other than its file and couldn't be found when an examiner was looking for it."

Paper tiger tamed

Under the manual filing system, customers often complained about lost claims, Dill said. But with the image processing setup, the company has not received a single complaint regarding a lost claim, "probably because there is never an out-of-file situation with imaging," Dill said.

Lincoln National has realized a number of other benefits from the imaging system. Initially, the company thought the system would be paid for in five years; now Dill said he expects the imaging system to pay for itself in only three years.

"We've measured a 20% improvement in payment of claims, with each examiner going from paying 43 claims per day to roughly 53," Dill said. "This is because they don't have to move paper. Claims are downloaded to the workstation."

The 20% examiner productivity increase represents about $5,200 savings per examiner per year based on an examiner's salary, Dill said. This translates into annual savings of $1.3 million. He said he expects the number of examiner workstations to almost double, from 268 today to 500 by June 30, as more examiners are brought aboard.

Although the imaging system may give Lincoln National an edge by enabling its agents to process claims faster than some of its rivals, the competitive advantage may be short-lived, according to Dill.

"In the insurance industry, you don't have an opportunity to have differentiated products for long because you don't copyright or trademark them," Dill said. "When you put a product on the market, other people can copy it. You get about a six-month advantage on the competition."

Dill said he hopes the system will eventually be used throughout the corporation. "We think it can be a utility — something like a telephone," he said.

> With the image processing setup, the company has not received a single complaint regarding a lost claim.

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Worth Noting

"The benefits of electronic data interchange are dependent on two major variables: the rate of implementation with trading partners and the amount invested in reengineering business processes and work flows."

Tom Colberg
Partner
Price Waterhouse
Washington, D.C.

Association Watch

INTEROP, Inc. recently announced it is accepting nominations for its second annual INTEROP Achievement Awards to honor users that have made the most effective use of internetwork technology to further business goals.

Winners will be named in four categories: manufacturing, service, government and education. Nominations are due by July 1. Contact Wendy Gibson, INTEROP, 480 San Antonio Road, Suite 100, Mountain View, Calif. 94040; (415) 917-2214.

Networking Careers On-Line is a new recruitment service that lists job openings in *Network World's* on-line bulletin board. The service began this week.

Readers can access job listings by dialing into *Network World's* bulletin board and selecting Network Careers On-line from the main menu. (For information on how to access the bulletin board, see the Table of Contents, page 2.)

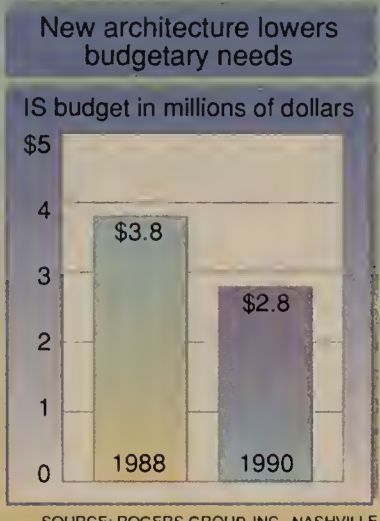
Advertisers listing a recruitment ad for one week in *Network World* can place the same ad for one month free of charge in the bulletin board.

For more information, contact Evilee Thibeault at (508) 875-6400 or Anne Marie Clark at (508) 777-6006. ◘

Firm's strategy for migrating applications off its mainframe

- Completed assessment of open systems and proprietary technologies for distributed systems.
- Presented recommendation and received senior management approval to proceed with open systems project.
- Migrated 3 of 10 major mainframe applications to Unix systems.
- Reduced IS corporate personnel from 36 to 30 and established a field support group of 2 people.
- Installed Unix PCs in 32 field locations.

IS = Information systems


New architecture lowers budgetary needs

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: ROGERS GROUP, INC., NASHVILLE

Construction firm moves applications to remote PCs

Saves money, reduces mainframe dependency.

By Maureen Molloy
Staff Writer

NASHVILLE — A highway construction and supply company based here has slashed its information systems (IS) budget by more than $1 million in less than two years by migrating mainframe-based applications out to multiuser personal computers in remote field sites.

The shift, designed to reduce Rogers Group, Inc.'s dependency on its mainframe and trim leased-line expenses, involved installation of Unix-based personal computers at 32 field sites and adoption of dial-up facilities to link the microcomputers to the host.

> "We realized IS needed to do things differently if we were going to meet, and then beat, our competition," Gmitter said.
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"We needed a leaner cost structure because, in this industry, cost is the greatest determinant of a company's competitiveness," said Tom Gmitter, Rogers Group's director of information services. "We found that the only way to achieve that goal was to get off the expensive proprietary mainframe architecture and onto a commodity platform like personal computers."

Gmitter said he began researching alternatives after discovering that Rogers Group's IS costs hovered above the industry average and that its IBM 4381 mainframe was nearing capacity.

"We realized IS needed to do things differently if we were going to meet, and then beat, our competition," he explained.

Implementing new applications for field offices on the centralized IBM 4381 DOS/VSE mainframe would require replacing the machine with an IBM 3090 and moving to the MVS operating system. To stem the demand on the mainframe, Gmitter instead chose to migrate mainframe applications to personal computers in the field.

"Considering that our costs relative to our competition were high anyway, we did not want to blow the top off our IS budget by going to an expensive, more powerful host," he said.

Another consideration was expedience. There was a strong need to roll out several applications, and Gmitter estimated that they could be implemented more quickly on personal computers than on the mainframe.

Increased productivity

According to Gmitter, the migration to microcomputer-based applications has resulted in a fivefold productivity gain. That is, applications that had once taken five hours to develop on the mainframe can now be created in about one hour on the personal computers.

Selling the distributed approach to executive management was difficult at first, Gmitter said, because the company's business systems committee — an IS steering committee comprising five senior executives — was ini-

(continued on page 46)

GE's X.500 directory boosts E-mail access

GEMS System helps users gather addresses, other data on users of disparate E-mail networks.

By Wayne Eckerson
Senior Editor

ROCKVILLE, Md. — General Electric Co. has deployed a centralized X.500 directory service that will enable the firm's 75,000 electronic mail users to electronically access E-mail addresses, telephone and facsimile numbers, as well as other information about GE employees.

The GEMS System 2000 directory is helping users to communicate with colleagues on different E-mail systems and, in the future, will make it easier to communicate with non-GE employees who have X.500 directories.

The directory now supports listings for about 40,000 users on several major E-mail platforms: IBM's Professional Office System, Digital Equipment Corp.'s VMSmail and All-In-1, and GE Information Services' (GEIS) BusinessTalk and PC MailBox, which operate over GEIS' value-added network. The remaining 35,000 users will be brought on-line within the year.

"Even though we interconnected our E-mail systems several years ago, there has been little cross-platform messaging because people didn't know each other's addresses and the [addressing] syntax is such a bear to work with," said David Shettler, project manager for the General Electric Electronic Mail System in Bridgeport, Conn.

The GEMS System 2000 directory consists of a data base of names and addressing information, as well as message routing tables, all of which reside on a Unix-based Hewlett-Packard Co. minicomputer here. Users access the data base in real time across GE's net using specially designed workstation software.

The software allows users to search the data base for names and addresses using four criteria: last name, first name, company and location.

Once a name is selected, the software enables users to request additional information about that

(continued on page 28)

BOOK REVIEW

BY ERIC SCHMALL

Guide helps separate ISDN facts from fiction

ISDN: A Manager's Guide to Today's Revolution in Business Telecommunications, Ian Angus (Pickering, Ontario: Telemanagement Press, 1990), $39.00.

Ian Angus' work represents the best in network apologetics: His book vigorously defends Integrated Services Digital Network against its critics. At the same time, he debunks the concept that ISDN is a cure-all. The result is a balanced, readable introductory text on a complex technology.

Angus, president of Angus Telemanagement Group, Inc., a Pickering, Ontario-based consulting firm, states early on that his reason for writing this book was to "translate ISDN into English — to help fill the gap between advertising and engineering." His book largely succeeds on this score, offering a clear guide to the evolution of ISDN. He discusses the criticisms leveled at ISDN (such as "ISDN competes with local-area networks" and "ISDN is too little, too late") and refutes them. He also provides examples of successful ISDN tests, both in labs and in real life, and outlines steps network managers can take to integrate ISDN into their strategic planning.

The middle portion of the book consists of a 50-page supplement that lists 45 practical applications of ISDN. The first 23 are based on experiments conducted by Southwestern Bell

(continued on page 28)

Schmall is a network systems manager at an insurance holding company.

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GE's X.500 directory boosts E-mail access

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person, such as titles, phone numbers, street addresses and free-form information that the person has chosen to include in their directory profile. In this sense, the GEMS System 2000 will serve as a companywide White Pages, Shettler said.

Once a user decides to send an E-mail message, the system automatically downloads the address into the message without the user having to know or record it.

"We wanted to make the system intuitive and as easy to use as possible. Otherwise, it wouldn't work," Shettler said. "We don't have the time or resources to train 75,000 people to use a complex system."

The X.500 directory data base is being loaded with addressing information gleaned from existing local directories and E-mail nodes, said Nancy Williams, GEMS project manager for GEIS. Once all the names are loaded, users will be responsible for maintaining and updating their directory profiles, she said.

Williams added that the local directories will not disappear once the GEMS directory is in place. Users will likely use the local directories to search for addresses of people in their immediate work area and use the GEMS system to get addresses for people outside their areas or on other E-mail systems.

Work on the directory began in January 1990 after top management signed off on a plan that was shaped largely by a GEMS advisory panel consisting of representatives from each GE business unit.

This panel turned over development of the directory to a team of 20 communications specialists at GEIS, which provides operational support for GEMS.

The GEIS team developed the message routing tables and the custom interfaces between user workstations and the Unix minicomputer. The routing tables stored on the minicomputer generate the address information needed to route E-mail messages from one workstation to any other on GE's net. This routing information is downloaded directly into a user's E-mail application.

Workstation users on IBM Systems Network Architecture and DEC DECnet networks communicate in real time with the GEMS directory using Transmission Control Protocol/Internet Protocol and X.25 protocols respectively. The Unix system is linked to the GEIS network via X.25.

GE decided to build custom interfaces rather than implement X.400 interfaces for two reasons: cost and ease of use, Shettler said.

"Purchasing an X.400 interface for a single IBM 3090 system would have cost more than we will spend on the whole project, which will be well under a million dollars," Shettler said. "In addition, it would have forced users to learn a new addressing format."

Shettler said the custom interfaces enable users to access the GEMS System 2000 directory in a format nearly identical to the one used by their E-mail system.

A more challenging problem is loading client software on each E-mail user's computer. Manually loading the software onto 75,000 workstations would take forever, according to Shettler.

In the DEC environment, for example, there are 5,000 VAX nodes and 30,000 E-mail users. Rather than load the directory software on each user's system, the team plans to send each user a set of instructions that tells them how to download the software from their local node and get it running.

"We needed to have a mechanized process for distributing this software. Otherwise, we would never get it done," Williams said.

Currently, the directory is intended for internal use only, but Shettler said that in the near future, GE hopes to make the directory available to outside parties to facilitate intercompany messaging.

However, Shettler said controlling user access to the directory is worrisome. Many users have pointed out that the 1988 version of the X.500 standard, which is the most recent, does not provide adequate controls to limit the information that individuals — especially outside parties — can obtain from X.500 directories.

"We are now developing what we call a 'White Pages' for internal use, but eventually, we may have to create a Yellow Pages version, which limits the information available to non-GE people." ◼

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Guide helps separate facts from fiction

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Corp. in 1988 and previously written up in an Institute of Electrical and Electronics Engineers, Inc. journal. The last 22 applications are drawn from a US West, Inc. demonstration at an ISDN forum in 1989. This section, which delves deeply into the technical aspects of ISDN, could be a problem for readers who do not have a significant understanding of ISDN.

After the supplement, the book highlights the experiences of ISDN pioneers such as McDonald's Corp. The final chapters suggest ways managers can prepare for ubiquitous ISDN. The chapters also describe practical applications for ISDN.

Angus writes well and he makes a reasonable case for ISDN without being enraptured by it. For simplicity, balance and encouragement, this text deserves to be given respectful attention.

It can be ordered from Telemanagement Press by calling (415) 420-5050. ◼

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

World News

Canada's domestic satellite service provider, **Telesat Canada**, recently completed a successful launch of the first of two satellites that will expand the service provider's U.S. reach.

According to Telesat Canada, the Anik E2 satellite was successfully launched on April 4. Beginning on May 21, the Anik E2 will replace the older Anik D1 and Anik C1 satellites as Telesat Canada's primary vehicles for providing satellite services. Anik E2 will have a range extending over all of Canada and the 48 contiguous U.S. states.

Currently, Telesat Canada's satellites have a range extending as far south as Tennessee ("Telesat Canada to launch satellite to bolster service," *NW,* March 18).

AT&T last week said it is nearly half finished with installing five fiber-optic links between its U.S. public network and the public network operated by monopoly carrier Telefonos de Mexico S.A. de C.V. (TelMex) in Mexico.

The five fiber links are each a few miles long and run between five AT&T points of presence on the U.S. side and five TelMex points of presence on the Mexican side. The first two links were installed last year, and the last three will be operational by November, according to AT&T.

These digital links will be extended via connections with a fiber-optic backbone network, using digital switches, that will link 54 Mexican cities by 1993, AT&T said. ◼

Comdisco plans to support hot sites via int'l network

Net to offer critical redundancy for multiple users.

By Barton Crockett
Senior Editor

ROSEMONT, Ill. — Comdisco Disaster Recovery Services, Inc. is planning to build an international network that is expected to help the company better serve users in the event a regional disaster knocks out multiple data centers outside the U.S.

By opening new disaster recovery hot sites in Australia, Germany, Japan and Malaysia, and linking them in a high-speed digital network to existing hot sites in France, Singapore and the U.S., Comdisco expects to more effectively support multiple users during regional disasters, according to John Jackson, a Comdisco executive vice-president here.

> "The links would provide access to any of our computer recovery centers from any other."

▲▲▲

For example, if five users in Singapore simultaneously lost their data centers because a tsunami washed across the island, those users would have to attempt to move operations into the one disaster recovery center Comdisco operates in the country as part of a joint venture with a local firm. But that one hot site might not be able to support all of those users.

With a global network, Comdisco would be able to easily shift some Singapore users to a hot site in Malaysia, thereby guaranteeing each company a means of recovery. Users in Singapore would access applications running in Malaysia via Comdisco's global network, Jackson explained.

"The purpose of the links would be to provide access to any of our computer recovery centers from any other location," Jackson said.

Net up in 1992

Comdisco plans to begin constructing the disaster recovery network by early next year, Jackson said. It will consist of broadband digital satellite links between hot sites in Australia, Japan, Malaysia and Singapore.

Additionally, a broadband digital satellite link will probably join hot sites in Singapore and Paris, as well as hot sites in Singapore and the U.S. A German hot site will also be linked into the network via the Paris node.

The Australian, German, Japanese and Malaysian hot sites are expected to be cut over later this year, Jackson said. Comdisco also is examining the possibility of building hot sites in Taiwan and Hong Kong, although Jackson declined to say when these hot sites would be constructed.

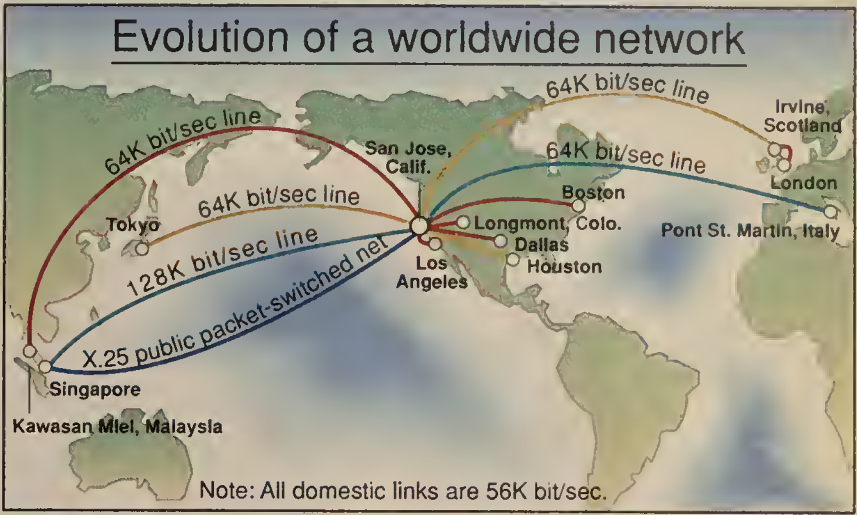
Comdisco is building foreign hot sites as part of a joint venture with local firms in which Comdisco has an equity investment.

Paul Kirvan, principal of Paul Kirvan & Associates, a consultancy in Turnersville, N.J., that specializes in disaster recovery, agreed that users will be interested in using Comdisco's global recovery network, provided it is priced attractively.

Kirvan said users will be particularly interested in employing Comdisco's recovery network for

(continued on page 32)

Evolution of a worldwide network



Note: All domestic links are 56K bit/sec.

Tracking the expansion of Conner Peripherals' network. Site additions:

Year	Month	Site
1987	Sept.	New Tech Park, Singapore
1989	July	Pont St. Martin
	Oct.	New Tech Park (line upgrade)
1990	Feb.	Irvine
	Aug.	Houston
	Nov.	Tokyo
1991	Feb.	Kawasan Miel and Dallas
	March	Longmont
	April	Los Angeles, Boston and London

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: CONNER PERIPHERALS, SAN JOSE

Rapid growth spurs Conner's global net

Disk drive maker's network grows quickly to meet firm's burgeoning communications needs.

By Maureen Molloy
Staff Writer

SAN JOSE, Calif. — In just four years, Conner Peripherals has grown from a start-up firm to a $1.4 billion company and its international network has expanded from a single X.25 connection to the Far East into a global web of high-speed dedicated lines.

The disk drive maker's rapid rise — Conner is cited by *Fortune* magazine as the nation's second fastest growing major industrial firm — has put the company's IS staff to the test, adding new sales and manufacturing facilities to the corporate network.

"Our network plans are completely dictated by the company's growth," said William Swartz, Conner's operations and technical support manager. "We didn't have the luxury to sit down and do sophisticated network planning. But given our time constraints, we've still been able to implement a network that handles the company's communications needs."

Conner's network started off simple enough. The company linked its headquarters here to a manufacturing plant in Singapore through a public X.25 packet-switching service. But with data traffic expanding over the link, the company soon switched to a 128K bit/sec dedicated link, which also carries voice.

As the business continued to

(continued on page 32)

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V.P., Engineering
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1988 *Sprint completes the only nationwide 100% digital fiber optic network. Awarded 40% of Federal Telecommunications System 20* [illegible]

1985 *Sprint introduces the world's first VPN.℠* 1986 *First transcontinental fiber optic call transmitted by Sprint.* 1987 *Eight million FŌNCARDs℠ distributed in first year.*

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privately-owned transatlantic fiber optic cable completed. 1990 *Sprint announces first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

Comdisco to support sites via int'l net

continued from page 29

electronic vaulting, in which copies of vital data are regularly communicated on-line from a user's data center to a local hot site. Kirvan said Comdisco could enhance its electronic vaulting services by letting users communicate copies of vital data to remote hot sites in other countries.

Other service providers

Jackson said he knows of no other firm that is planning to build a global disaster recovery network. But Kirvan said Comdisco's two biggest competitors, SunGard Recovery Services, Inc. and IBM, will probably jump into the business if Comdisco's network proves successful.

Currently, Sungard has no hot sites outside the U.S., though the company has a joint marketing agreement with a Canadian firm that enables it to use a hot site in that country.

IBM has hot sites in more than 14 countries, according to Gene Sain, manager of marketing support at IBM's Business Recovery Services unit in Franklin Lakes, N.J. He said users can use the IBM Information Network to access hot sites outside their country, though no users are doing that.

However, he said the vendor is talking with a South American company about using the Information Network to access an IBM hot site in Tampa, Fla. ◼

Rapid growth spurs Conner's global net

continued from page 29

expand, so did the need for additional manufacturing plants. Four more factories have sprung up during the past two years in Italy, Japan, Malaysia and Scotland, and they are linked to San Jose via 64K bit/sec lines.

"The Scotland plant was constructed in less than 90 days, so our initial goal was just to get a point-to-point line up and running," Swartz said. "Eventually, we'll go back and add redundancy to each line."

The dedicated lines link Hewlett-Packard Co. HP 3000 minicomputers to HP 3000s at headquarters. The minicomputers run business applications that can be accessed by personal computer users on Ethernet local-area networks running Banyan Systems, Inc.'s VINES. Quest Software's Netbase software is used to connect users on the LAN at headquarters to remote data bases.

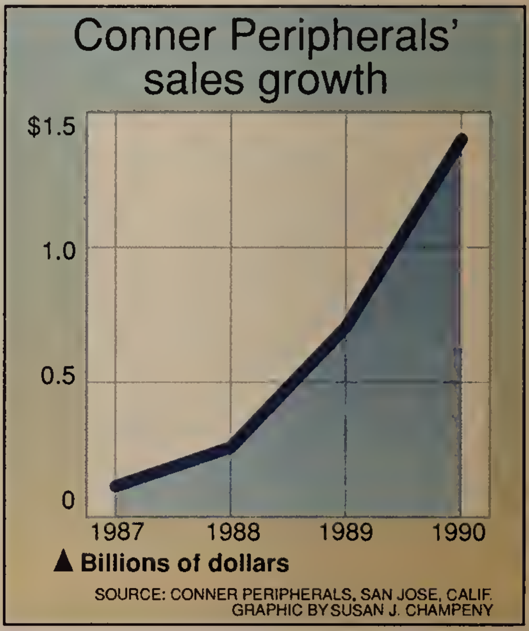
The international network supports exchange of electronic mail, inventory data and order processing information, as well as financial information for accounting, marketing and sales.

Down to the desktop

Robert Vance, Conner's MIS director, said the company's goal is to drive processing down from the minicomputer to the desktop.

"We need real-time information to run the company and to continue growing," he said. "The network gives us the advantages of a decentralized system while making companywide information readily available to every user."

Conner Peripherals' sales growth



SOURCE: CONNER PERIPHERALS, SAN JOSE, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

The company has just completed installation of 56K bit/sec dedicated lines to link headquarters to new sales offices in Boston, Dallas and Los Angeles. Two additional 56K bit/sec lines were installed this month to link San Jose to a company repair center in Houston and to a research and development site in Longmont, Colo.

Tough at first

Swartz said his staff was not initially prepared for Conner's rapid expansion.

"The first two years were hairy because we didn't have the time, proper tools or staffing in place to handle overwhelming communications needs," he said. "It's still runaway growth, but now we're better able to handle it."

Bringing on a larger and more seasoned staff is making the process more manageable, he said.

Swartz said the network's star topology will eventually be changed to a mesh network by linking the international sites to one another. That will build redundancy into the network.

"Network reliability is critical, but we haven't had the time to install these added features," he said.

The 128K bit/sec line to Singapore is the only link that accommodates voice traffic, but eventually, all international and domestic links will carry both voice and data, he said. Dial-up lines currently support voice communications from headquarters to all the other sites.

"We've done well keeping pace with the growth, and we're working hard to ensure that we don't get caught in a position where technology slows our growth," Swartz said. ◼

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

CLEO offers Unix gateway for PC-to-host links

CLEO Communications recently released a new version of its 3270LINKix software that lets a Unix personal computer acting as a host gateway set up as many as 254 sessions for local workstations.

With **3270LINKix Remote,** a personal computer workstation can operate as an IBM 3278 monochrome or IBM 3279 color display terminal. The software also enables a Unix system to emulate an IBM 3274 cluster controller, supporting as many as 32 sessions for Binary Synchronous Communications or Systems Network Architecture/Synchronous Data Link Control communications. The software uses a CLEO synchronous interface board in the personal computer and supports data rates over 19.2K bit/sec to remote sites. CLEO offers 3270LINKix Remote in versions supporting two, 32 or 254 sessions. Prices range from $1,295 to $2,995, depending on the number of sessions supported. The product will ship in the second quarter.

CLEO Communications, 3796 Plaza Drive, Ann Arbor, Mich. 48108; (313) 662-2002.

Firm serves up MCI Mail access for QuickMail

Solutions, Inc. has announced a new version of its MCI Mail gateway called **CommGATE/QM** that will enable CE Software, Inc. QuickMail users to exchange electronic mail with subscribers on the carrier's net.

Designed to run on a Macintosh file server, the QuickMail software will allow QuickMail users to exchange messages with other E-mail nets interconnected to MCI Mail. A QuickMail message can be sent through MCI Mail for delivery by overnight courier, fax, telex or U.S. mail.

CommGATE/QM is priced at $395 for five users. Additional user packages are available in various sizes starting at $195 for five additional users. Solutions plans to ship CommGATE/QM by this summer.

Solutions, Inc., 30 Commerce St., Williston, Vt. 05495; (802) 865-9220.

3Com intros 32-bit E-net card for PCs

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — 3Com Corp. last week introduced EtherLink/MC 32, a 32-bit Ethernet adapter for Micro Channel Architecture personal computers that offers high throughput and minimizes usage of the host's processor through bus mastering.

With the 32-bit architecture, information is moved 32 bits at a time, as opposed to 16 bits at a time, as is the case with 16-bit architectures, explained Dave DePuy, marketing manager at 3Com's network adapter division, based here. The 32-bit architecture is currently the fastest available on a personal computer or workstation.

Bus mastering minimizes CPU utilization by allowing the adapter to control the transfer of information directly to and from memory instead of having the CPU act as a middleman. That frees the CPU to do other tasks, DePuy said.

3Com is positioning this product for use in multitasking or multiprocessing servers.

3Com's new product has received praise from Novell, Inc. and Parallan Computer, Inc. "The [Novell] NetWare network operating system is designed for servers loaded with add-on hardware. Network performance depends upon the adapter's ability to minimize CPU utilization," said John Edwards, product line manager for enterprise network operating systems at Novell.

William Patton, chairman of Parallan, concurred. "3Com's new adapter enables the network to support greater numbers of nodes per server adapter."

> The 32-bit architecture is currently the fastest available on a PC or workstation.
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This is the first time 3Com has combined the 32-bit architecture with bus mastering. "Before, 3Com did not offer a high-performance adapter with low CPU utilization," DePuy said.

EtherLink/MC 32 is available now for $899.

For more information, contact 3Com at 3165 Kifer Road, Santa Clara, Calif. 95052, or call (408) 764-5000.

New interface allows IBM PC AT to act as small hub

IRVINE, Calif. — Gateway Communications, Inc. this week is scheduled to introduce an interface that will enable users to position an IBM Personal Computer AT as a small hub, linking as many as four other devices via unshielded twisted-pair wiring.

The device is particularly suited for small work groups, enabling the connection of four to five users at less cost than investing in full-scale hub systems, according to Bert Ott, Gateway's vice-president of sales and marketing.

The new G/EtherTwist AT Hub is an IEEE 802.3 Ethernet adapter and a four-port 10BaseT hub on a single card. When loaded into a single slot on a personal computer, the device links five nodes including the device that houses it.

The interface acts as the central unit in a star-configured network, supporting cabling runs to workstations at distances up to 328 feet. It provides LED indicators to display net activity and the status of link, transmit, receive and jabber conditions. The product's LAN interface functions are supported by a separate 64K memory buffer.

The G/EtherTwist AT Hub comes with drivers for Novell, Inc. NetWare, Microsoft Corp. LAN Manager, Banyan Systems, Inc. VINES, IBM LAN Server and Transmission Control Protocol/Internet Protocol nets.

Gateway said users can expand the hub with a G/EtherTwist AT Hub Expander board that plugs into an eight- or 16-bit personal computer expansion slot to provide four additional RJ-45 connections. As many as two G/EtherTwist AT Hub Expanders can be directly attached to a single hub adapter, providing support for as many as 13 nodes.

Available now, the G/EtherTwist AT Hub costs $800 and the G/EtherTwist AT Hub Expander costs $400.

For more information, contact Gateway at 2941 Alton Ave., Irvine, Calif. 92714, or call (714) 553-1555.

Firms construct T-3 videoconference net

Sony and WilTel units pool resources to create ViaTV, a broadcast-quality and portable system.

By Paul Desmond
Senior Editor

TULSA, Okla. — Subsidiaries of Sony Corp. of America and WilTel recently jointly introduced a new portable videoconferencing system that uses switched T-3 facilities.

The companies said their system, dubbed ViaTV, is competitively priced with systems that use T-1 or lower bandwidth circuits but offers broadcast-quality video and audio, representing a dramatic improvement over those systems.

ViaTV is offered as a turnkey system that comes with T-3 transmission services and a package of cameras, monitors, audio components and other equipment integrated into a single cabinet that can be moved from room to room within a building.

Merrill Lynch & Co., Inc. is testing ViaTV between its Somerset, N.J., headquarters and a new operations facility in Lakewood, Colo. The quality of the system is excellent, while the pricing structure allows users to pay for service in 15-minute increments, said Mike Vande Woude, vice-president of telecommunications at Merrill Lynch.

WilTel subsidiaries Vyvx National Video Network (NVN) and Vyvx RSI are providing the switched T-3 service and system integration, respectively, for ViaTV.

Sony's Conference and Satellite Systems Division is supplying the majority of the videoconferencing equipment, which will vary according to user requirements, said Frank Rudolph, executive vice-president of hard and soft engineering at Vyvx RSI.

As part of the ViaTV service, Vyvx RSI will outfit any room where the video service is required with a business television interface module.

The module provides all the interfaces required to support the videoconferencing gear housed in the portable cabinet. It is also linked to a central patch panel that acts as the distribution system for the building, Rudolph said.

An analog circuit known as a TV-1 link, which supports a 6-MHz video and two 15-kHz audio channels, runs from the customer's premise to the nearest Vyvx NVN switching center for connection to Vyvx's NVN's T-3 network.

There, a video coder/decoder (codec) converts the analog signal to a digital T-3 signal for transmission to the remote Vyvx NVN switching center, where another codec changes the signal back to analog for the final hop to the remote site.

Equipment costs for ViaTV range between $73,000 and $130,000. Service is priced at $600 per hour for two-way transmission, whereas T-1 video services cost about $320 hour, according to Vyvx NVN.

Perhaps more importantly, said Merrill Lynch's Vande Woude, the service is priced at $200 for each 15-minute increment. "The cost is reasonable if the time you use is not significant," he said.

> The pricing structure allows users to pay for service in 15-minute increments.
>
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Vande Woude also liked the flexibility provided by being able to move the video equipment from room to room. He said four or five rooms in each building have been outfitted with interface modules.

"Our real concern is the local loop costs," Vande Woude said. "If there's a negative to this, that's it."

Merrill Lynch is paying $4,000 per month for a microwave analog video link to a distant Vyvx switching center and $2,000 for the local loop in Colorado.

He said that while the quality of the ViaTV service and equipment is excellent, usage levels will determine whether the company continues to employ the offering beyond the trial period, which ends in early fall.

The alternative would be to support video on Merrill Lynch's own network using lower speed circuits, such as 256K bit/sec, which Vande Woude said is adequate for most commercial business applications.

WilTel's national sales organization will sell and service ViaTV.

OPINIONS

TELECOMMUNICATIONS PROFESSIONALS

BY JAMES CARLINI

Pardon my prod — are you cattle or catalysts?

During recessionary times, it becomes obvious that two basic types of telecommunications people exist: cattle and catalysts.

The catalysts take charge and move a project from conception to implementation. They are not afraid to ask senior management for funding in spite of the recession. They are not afraid of hiring outside help if they think it's justified. They are proactive and take risks. They accomplish their objectives.

The cattle come to work, graze at their desks and don't get moving on anything unless they're prodded. They adhere to obsolete methods and technology while trying not to rock the boat. "Let me think about that" is the all too familiar moo of the indecisive.

We all know the type — the ones with the bottomless cup of coffee in one hand and a donut in the other. They have "all the answers" except the ones they need today. They don't want to create any new work for themselves. And unfortunately, they are found at all levels of systems management.

User companies have started driving the cattle off their territory. They are laying off telecommunications people in droves — not just low-level technicians, but people in the $60,000 to $140,000 salary range.

> "Let me think about that" is the all too familiar moo of the indecisive.
>
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Take charge and take action!

How can you avoid becoming part of the herd? Start by forgetting about the economic slump. Go out and develop new applications. Get the jump on your competitor now while all of his cattle are grazing and waiting for the next millennium. Catalysts don't hide behind the excuse of the month.

Instead of waiting or trying to analyze everything down to the last nickel, take a proactive approach. Learn why technology is strategic to your organization's market share or how it can improve customer service. In addition, learn how to justify new technology from this standpoint, not only from cost savings.

Cost cutting does not expand market share and sometimes can shatter quality customer service. Forget about cost cutting as the *only* reason to invest in new technology. Consider electricity for lights, personal computers and other electrical appliances; you can cut electricity costs until you are left in the dark. Then what would be the point of coming to work?

Where should you spend money to make money? That is the question catalysts ask themselves. Major applications that improve the quality of customer service or expand market share by using new capabilities should be blossoming all over. If this is not the case at your organization, maybe you should be putting a bell around your neck. If vendors constantly go over your head to find someone willing to make a hard-and-fast decision, there's a good chance you are just one of the cattle.

If that is so clear to those of us outside your organization, the people who see you daily on the inside are probably thinking about getting those "put out to pasture" pink slips ready. This is reality. If it has upset some of the cattle into spilling their coffee and waking up — good. They are on their way to becoming a catalyst.

Carlini is president of Carlini & Associates, Inc., a management consulting firm in Hinsdale, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

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EDITORIAL

Du Pont, feds vote for open systems with dollars

In the past, we've urged users to wield their buying power to get vendors to embrace standards.

So we're pleased to applaud when users actually use the buying process to push for open information systems. Cases in point: E.I. du Pont de Nemours & Co. and the federal government.

Recently, du Pont said it will begin requiring vendors of electronic mail, imaging and other products to support the Open Systems Interconnection Open Document Architecture (ODA) standard.

The ODA standard describes how documents containing text, graphics, images and other components are structured for exchange between systems from multiple vendors. Du Pont is hoping that ODA-based products will enable it to exchange information across disparate systems more quickly and less expensively than proprietary products and translation systems.

ODA isn't the first standard du Pont has thrown its purchasing weight behind. ODA will become a du Pont Corporate Information Systems standard alongside X.400 and other OSI standards.

In addition, the federal government recently released the second version of its Government Open Systems Interconnection Profile (GOSIP), a procurement specification that requires products purchased by the government to support certain open standards.

GOSIP Version 1, which kicked in last August, covered such standards as OSI File Transfer, Access and Management (FTAM), X.400, X.25 and certain local-area network standards.

Version 2, scheduled to take effect in October 1993, adds support for Integrated Services Digital Networks, the Virtual Terminal Protocol and the End System-to-Intermediate System routing protocol.

While the federal government can be criticized for moving slowly in many areas, it and a handful of other users such as du Pont have taken on a real leadership role in the open systems arena. By putting their purchasing power behind the call for open systems, du Pont and the federal government have raised awareness of open systems and spurred vendors to action.

It isn't enough to voice support for open systems and to complain about the lack of interoperable computing/network products. U.S. companies need to make open systems a reality in order to compete effectively in the world market.

More users like du Pont and the federal government should use the force of their dollars to show their support for open systems.

OPINIONS

Should communications consultants be licensed?

PRO:

By PERRY SCHWARTZ

The controversy between communications consultants and professional engineers specializing in communications is not only heating up but is long overdue. While communications has historically been the province of the professional engineer, there has been a recent surge in the number of consultants who have added the word "communications" before their titles on their business cards.

Consultants who are not professional engineers generally fall into two categories: past or present vendors, and recent college graduates hired by accounting or management firms. The latter category generally obtains information from suppliers and vendor-sponsored seminars on new applications.

Many accounting firms hire in this way to expand their services to clients, but they fail to retain a technically sound staff with proper professional engineering licenses. This failure may have led to the many lawsuits besieging these firms. Such an unprofessional method does not protect the public since it does not encourage development of technical standards for public safety and vital corporate communications.

Today's communications networks and systems are so complex that putting their design and control in the hands of nonregulated, unlicensed "professionals" is a true detriment to our lives, health, property and public safety. As we know, engineers are plentiful in vendors' research and development, systems, manufacturing, sales/applications and software engineering departments. But whose interests do these engineers represent, the vendors' or the users'?

The user needs a technical expert. So the question arises: Who is the best representative to define users' needs, systems and expenditures? Consultants who are not engineers are not prepared to provide innovative, cost-effective and user-oriented solutions because they do not have the knowledge to explain, describe and convince the vendor's engineers of the capabilities of a technology. In most cases, the unlicensed expert will have to

(continued on page 46)

Schwartz is president of Intertech Associates, Inc., a Marlboro, N.J., consulting engineering firm specializing in communications and electronics.

CON:

By EDWARD HORRELL

It seems that a few states want to regulate the communications consulting industry. They think they should issue licenses to consultants who want to operate consulting firms within their state.

This is a goofy idea for three main reasons.

- **Licensing is unnecessary because it is not needed.** What's the purpose? Is it to protect the user, as is being touted? Or is it to aid the marketing efforts of a few technicians who are finding it hard to find work?

Now before someone starts yelling that there are too many consultants, let me state that I agree. There are, indeed, unscrupulous, uneducated, inexperienced scam artists in the communications industry passing themselves off as consultants. They come into the consulting business in a variety of ways.

Some are between jobs, have had to cope with an early retirement or have just been laid off. They call themselves consultants because it looks better on a business card than "out-of-work individual."

Similarly, some so-called consultants are more accurately known as salespeople. They get commissions or kickbacks from companies for providing users with certain products or services. And, admittedly, those types are large in number.

But is this cause for licensing? Not on your life. Consultants are paid to give advice — usually based on what they have learned. They are selling experience, not knowledge of a history of facts, such as with law, or knowledge of a science, such as with medicine.

We're dealing with business efficiencies — the essence of free enterprise — and with how one company can use information technology to get an edge over its competition. And if users want to pay for that information, so be it. Don't restrict the source.

If my barber has information that will make my business more efficient, I want access to it. We're not talking about brain surgery here, and we're not talking about breaking laws in the way we communicate.

Businesses should be allowed to decide on their own where they can go to get the information they

(continued on page 44)

Horrell is president of The Horrell Consulting Firm, Inc. in Memphis, Tenn.

TELETOONS

BY FRANK AND TROISE

Look, Ralph.. it's definitely your turn to be Network Team Morale Officer, so stop complaining and go make your rounds.

LETTERS

Loss of a patriot

The communications industry lost a good friend during the Persian Gulf crisis. Maj. John Gordon of Houston was killed in a C5A crash in Germany.

John had been active in the computer and communications industries for the past 20 years. Companies he worked for include IBM, Four-Phase Systems, Inc., Case Rixon Communications, Inc. and Cable & Wireless Communications, Inc. He was a great competitor. We will miss John's leadership and integrity.

John was active in the reserves for many years. Those who worked with him never knew if he would have to jet off to a country halfway around the world over the weekend. John's love for his country and sense of duty were always clear. He volunteered for active duty in the early days of Operation Desert Shield.

Unfortunately, the insurance at John's last job ex-

(continued on page 46)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can put the bite on a communications operation. Many managers wrestle with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

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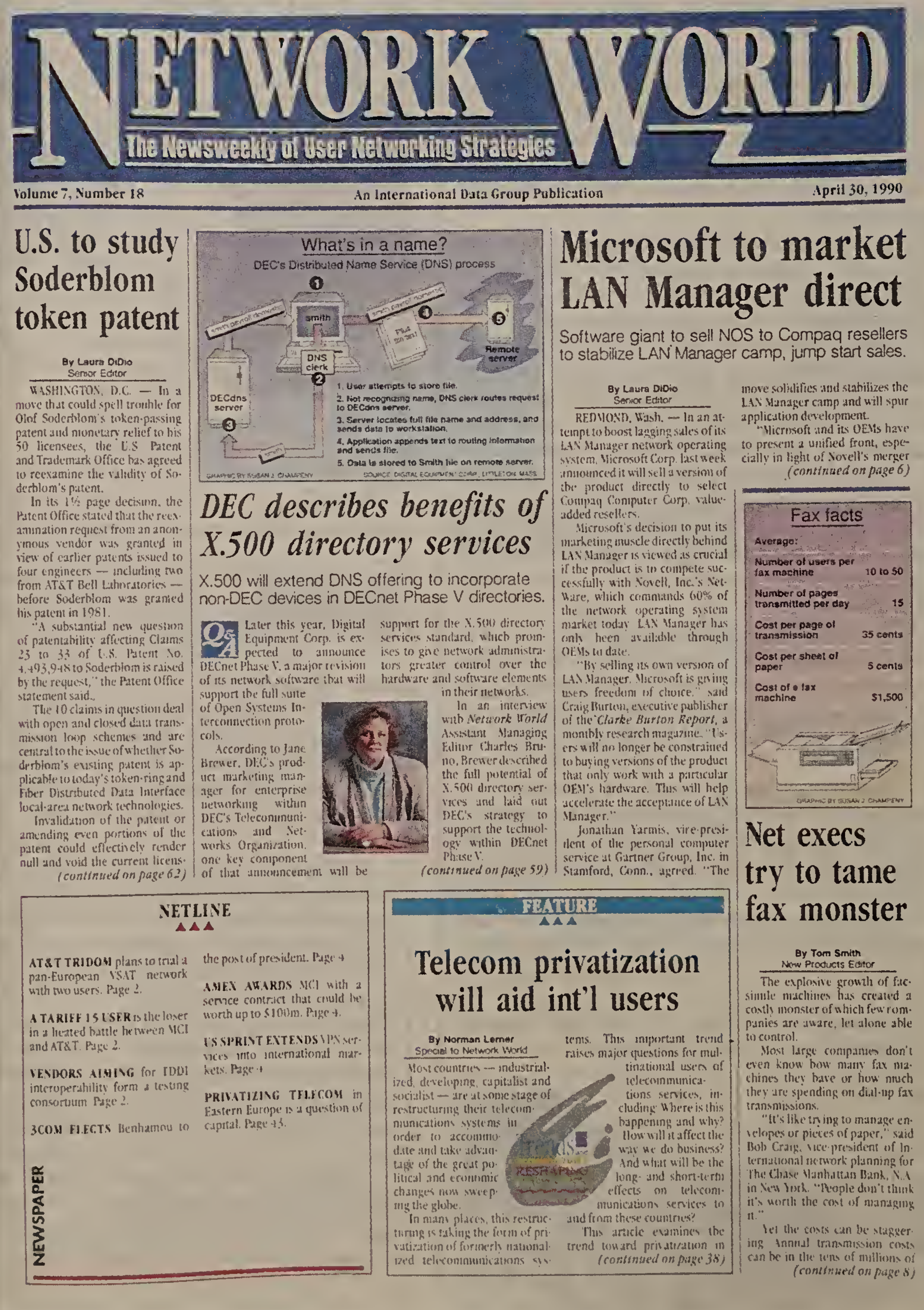

NETWORK WORLD
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U.S. to study Soderblom token patent

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — In a move that could spell trouble for Olof Soderblom's token-passing patent and monetary relief to his 50 licensees, the U.S Patent and Trademark Office has agreed to reexamine the validity of Soderblom's patent.

In its 1½ page decision, the Patent Office stated that the reexamination request from an anonymous vendor was granted in view of earlier patents issued to four engineers — including two from AT&T Bell Laboratories — before Soderblom was granted his patent in 1981.

"A substantial new question of patentability affecting Claims 23 to 33 of U.S. Patent No. 4,493,948 to Soderblom is raised by the request," the Patent Office statement said.

The 10 claims in question deal with open and closed data transmission loop schemes and are central to the issue of whether Soderblom's existing patent is applicable to today's token-ring and Fiber Distributed Data Interface local-area network technologies.

Invalidation of the patent or amending even portions of the patent could effectively render null and void the current licens-

(continued on page 62)

What's in a name?

DEC's Distributed Name Service (DNS) process

1. User attempts to store file.
2. Not recognizing name, DNS clerk routes request to DECdns server.
3. Server locates full file name and address, and sends data to workstation.
4. Application appends text to routing information and sends file.
5. Data is stored to Smith file on remote server.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: DIGITAL EQUIPMENT CORP., LITTLETON, MASS.

DEC describes benefits of X.500 directory services

X.500 will extend DNS offering to incorporate non-DEC devices in DECnet Phase V directories.

Q&A Later this year, Digital Equipment Corp. is expected to announce DECnet Phase V, a major revision of its network software that will support the full suite of Open Systems Interconnection protocols.

According to Jane Brewer, DEC's product marketing manager for enterprise networking within DEC's Telecommunications and Networks Organization, one key component of that announcement will be support for the X.500 directory services standard, which promises to give network administrators greater control over the hardware and software elements in their networks.

In an interview with *Network World* Assistant Managing Editor Charles Bruno, Brewer described the full potential of X.500 directory services and laid out DEC's strategy to support the technology within DECnet Phase V.

(continued on page 59)

Microsoft to market LAN Manager direct

Software giant to sell NOS to Compaq resellers to stabilize LAN Manager camp, jump start sales.

By Laura DiDio
Senior Editor

REDMOND, Wash. — In an attempt to boost lagging sales of its LAN Manager network operating system, Microsoft Corp. last week announced it will sell a version of the product directly to select Compaq Computer Corp. value-added resellers.

Microsoft's decision to put its marketing muscle directly behind LAN Manager is viewed as crucial if the product is to compete successfully with Novell, Inc.'s NetWare, which commands 60% of the network operating system market today. LAN Manager has only been available through OEMs to date.

"By selling its own version of LAN Manager, Microsoft is giving users freedom of choice," said Craig Burton, executive publisher of the *Clarke Burton Report*, a monthly research magazine. "Users will no longer be constrained to buying versions of the product that only work with a particular OEM's hardware. This will help accelerate the acceptance of LAN Manager."

Jonathan Yarmis, vice-president of the personal computer service at Gartner Group, Inc. in Stamford, Conn., agreed. "The move solidifies and stabilizes the LAN Manager camp and will spur application development.

"Microsoft and its OEMs have to present a unified front, especially in light of Novell's merger

(continued on page 6)

Fax facts

Average:	
Number of users per fax machine	10 to 50
Number of pages transmitted per day	15
Cost per page of transmission	35 cents
Cost per sheet of paper	5 cents
Cost of a fax machine	$1,500

GRAPHIC BY SUSAN J. CHAMPENY

Net execs try to tame fax monster

By Tom Smith
New Products Editor

The explosive growth of facsimile machines has created a costly monster of which few companies are aware, let alone able to control.

Most large companies don't even know how many fax machines they have or how much they are spending on dial-up fax transmissions.

"It's like trying to manage envelopes or pieces of paper," said Bob Craig, vice-president of International network planning for The Chase Manhattan Bank, N.A. in New York. "People don't think it's worth the cost of managing it."

Yet the costs can be staggering. Annual transmission costs can be in the tens of millions of

(continued on page 8)

NETLINE

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AT&T TRIDOM plans to trial a pan-European VSAT network with two users. Page 2.

A TARIFF 15 USER is the loser in a heated battle between MCI and AT&T. Page 2.

VENDORS AIMING for FDDI interoperability form a testing consortium. Page 2.

3COM ELECTS Benhamou to the post of president. Page 4

AMEX AWARDS MCI with a service contract that could be worth up to $100m. Page 4.

US SPRINT EXTENDS VPN services into international markets. Page 4

PRIVATIZING TELECOM in Eastern Europe is a question of capital. Page 45.

NEWSPAPER

FEATURE

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Telecom privatization will aid int'l users

By Norman Lerner
Special to Network World

Most countries — industrialized, developing, capitalist and socialist — are at some stage of restructuring their telecommunications systems in order to accommodate and take advantage of the great political and economic changes now sweeping the globe.

In many places, this restructuring is taking the form of privatization of formerly nationalized telecommunications systems. This important trend raises major questions for multinational users of telecommunications services, including: Where is this happening and why? How will it affect the way we do business? And what will be the long- and short-term effects on telecommunications services to and from these countries?

This article examines the trend toward privatization in

(continued on page 38)

The results are in and **Network World** is the clear leader. The 1990 Wall Street Journal/ICA Member Study is conducted among members of the prestigious International Communications Association (ICA), an organization whose representatives purchase $16 billion of information technology products and services each year.

Since **Network World** began in 1986, we've maintained a singular focus: to be the most useful source of information for users involved in multivendor, multisite enterprise networks and, in doing so, provide the most value for our advertisers.

Other publications focus on vertical technologies - or worse yet - relegate networking to a single section.

But network executives, responsible for managing multivendor enterprise networks, demand more.

And they read **Network World** because we focus on the total picture by reporting on every facet of the enterprise network - from departmental LANs to global networks.

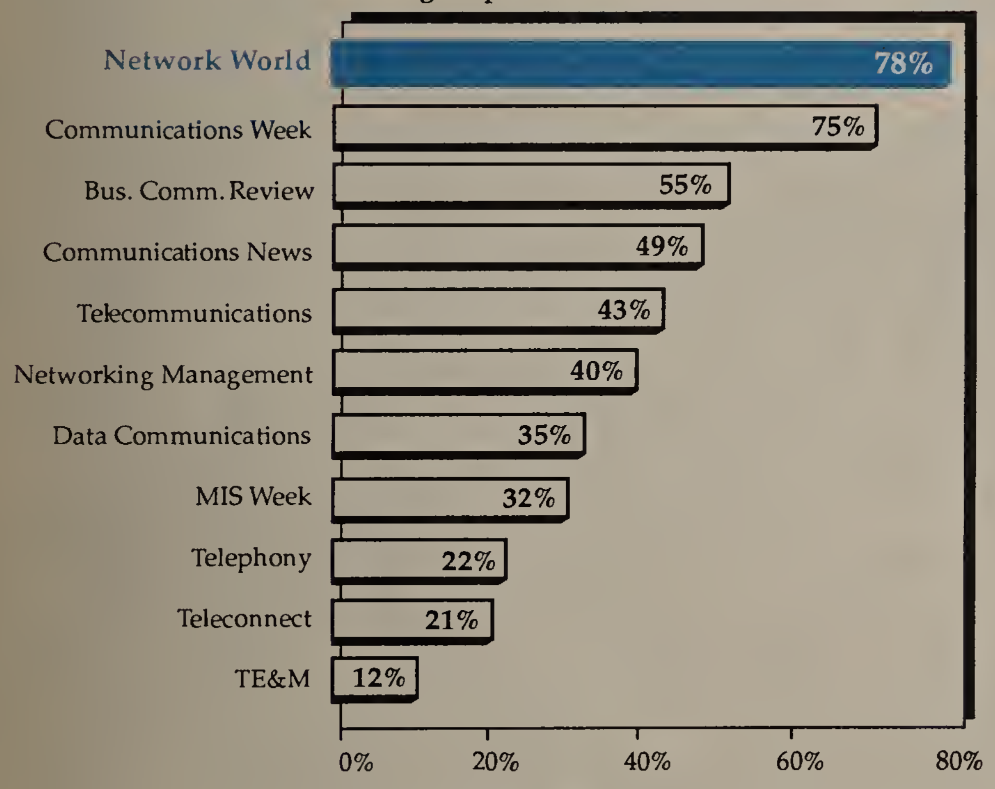
Thanks ICA for helping us prove once again that if you want to reach the professionals who control the network destinies of America, the people who buy networking products and services in volume for their enterprise, the best place to advertise is **Network World.**

Where the network world gets its network news.

ing Publication In America

Domestic Regular Readership

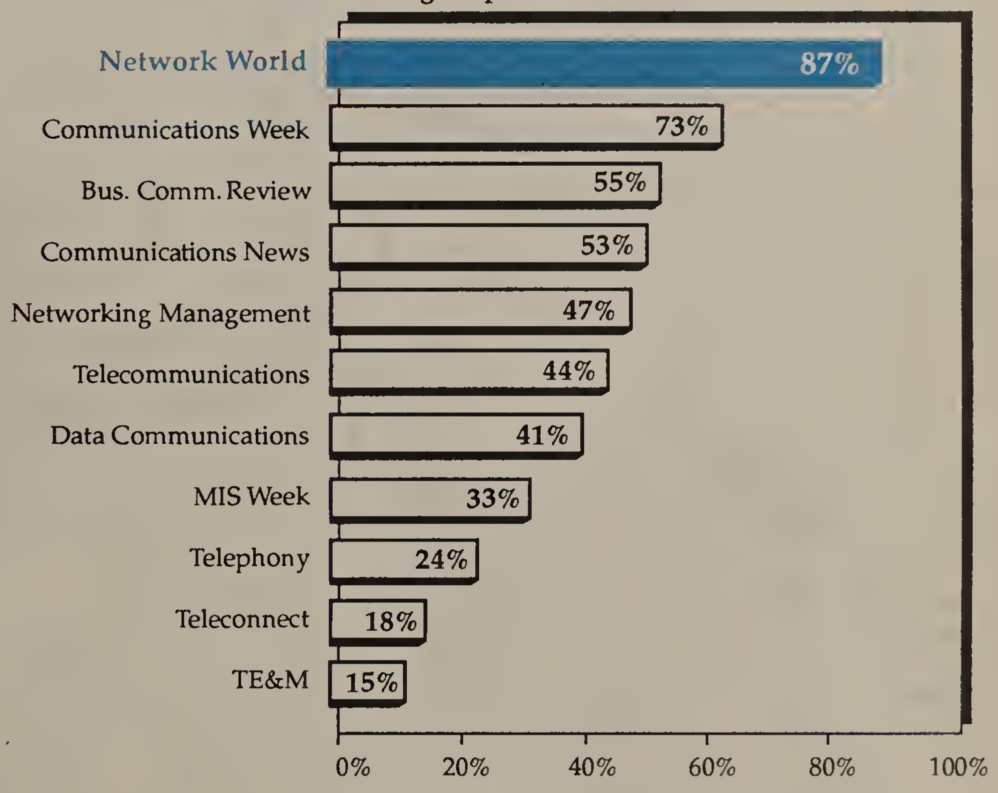
(Among Respondents with Domestic Networks)



Base: 336 Respondents
Regular readership is at least three out of four issues.

International Regular Readership

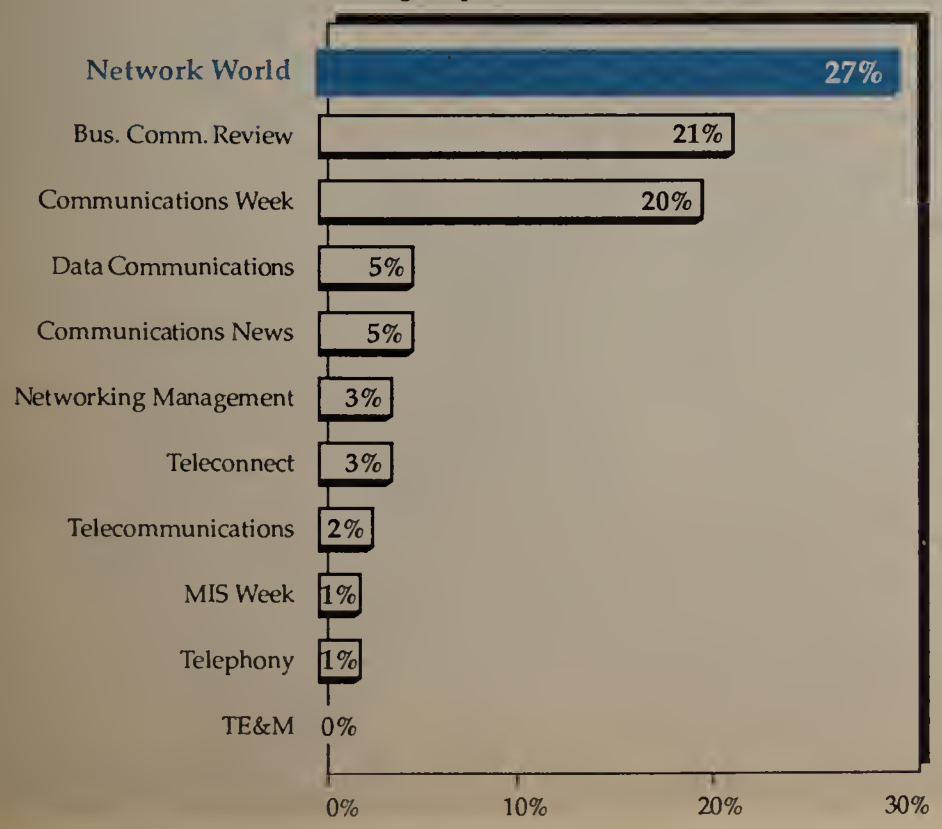
(Among Respondents with International Networks)



Base: 165 Respondents
Regular readership is at least three out of four issues.

Domestic Most Important/Useful

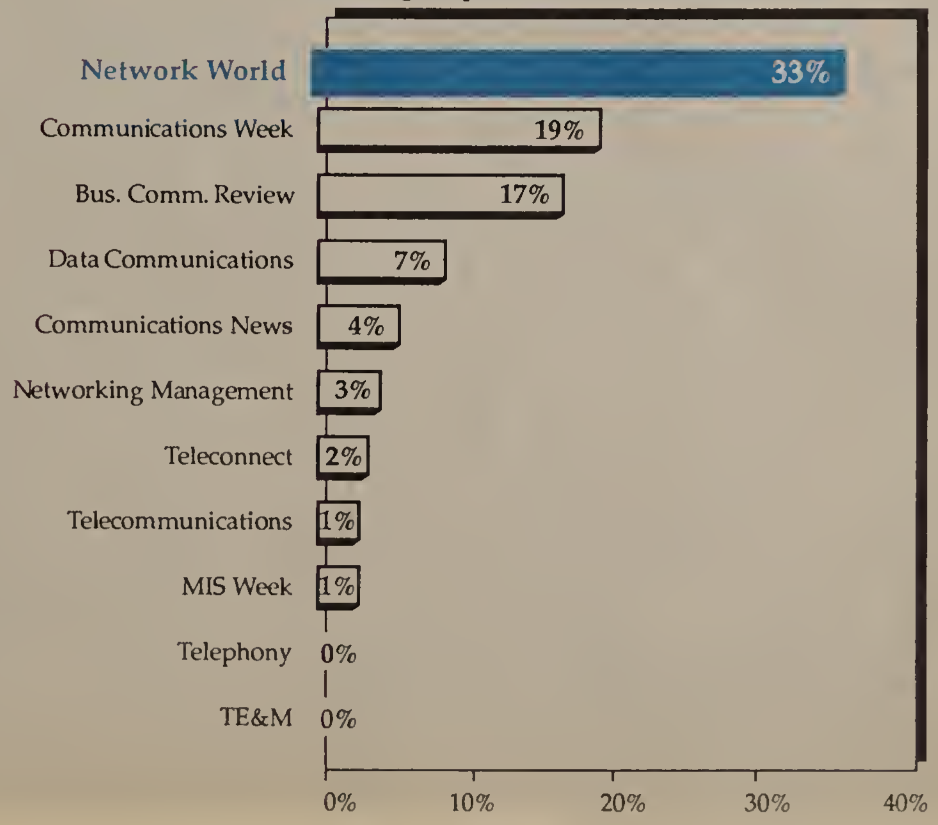
(Among Respondents with Domestic Networks)



Base: 336 Respondents

International Most Important/Useful

(Among Respondents with International Networks)



Base: 165 Respondents

Source :1990 Wall Street Journal / ICA Member Study

ILLUSTRATION ©1991 MARK HEMPSTEAD

Standards that matter

Here's the latest scoop on the status of the most important new standards in networking.

CONTINUED FROM PAGE 1

Two of the most important OSI management standards are ISO 9595/CCITT X.710, which details the Common Management Information Service (CMIS) standard, and ISO 9596/CCITT X.711, which lays out the Common Management Information Protocol (CMIP) standard.

Both standards were published in May 1990. CMIP and CMIS provide a flexible framework for the control and exchange of management information. CMIP describes the protocol itself, while the CMIS standard defines the behavior of the protocol.

Together, CMIS and CMIP define the bulk of the OSI network management protocol. Revised versions of CMIS and CMIP (called CMIS/CMIP Version 2) were published in January. With this update, CMIS and CMIP are expected to remain stable OSI building blocks for a number of years.

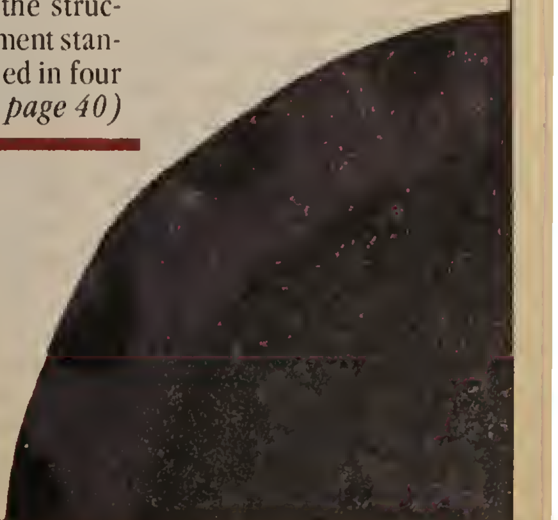
In addition to CMIS and CMIP, several other OSI standards have recently been completed. ISO 10165-1/CCITT X.720, ISO 10165-2/CCITT X.721 and ISO 10165-4/CCITT X.722. They all define the Management Information Model, which details the concept of managed objects and their corresponding attributes. And new standards in the ISO 10164-x/CCITT X.73x series define the management functions of the various managed objects.

The new CCITT X.800 standard describes a specified security architecture for OSI. All of these standards are in the final draft stage, with ratification expected by mid-1991.

To understand the significance of these new standards, it's important to consider the structure of the OSI management standards. They are published in four

(continued on page 40)

Turner is a technical staff manager at UDS Motorola, Inc. in Huntsville, Ala.



(continued from page 39)

functional series: architecture, protocol, management functions and the structure of management information (see Figure 2 on page 42).

With the completion of CMIS/CMIP and these new draft standards, the basic OSI management standards are now complete. Future enhancements will continue, but now that the OSI baseline is in place, products for managing networks will soon become available.

Hot GOSIP

Domestically, the U.S. government has gotten onto the OSI bandwagon by defining its own, tighter version of OSI, the Government OSI Profile (GOSIP). GOSIP, which has the weight of a Federal Information Processing Standard (FIPS) sets down what parts of OSI can be used by U.S. government agencies. Specifically, it is FIPS 146, which has been in effect since August 1990.

Since then, products and services procured by the U.S. government for purposes of open systems networking must conform to FIPS 146.

The National Institute of Standards and Technology (NIST) is expected to release its second version of GOSIP in a few weeks to incorporate recent OSI changes, says Kenneth Lini, president of Computing Unlimited. Government buyers will begin using the GOSIP 2 standard as a guideline for network purchases by early next year.

According to Lini, GOSIP 3 will include extensions to the File Transfer, Access and Management (FTAM) and Directory Services portions of the OSI protocol. GOSIP 4 will include transaction processing definitions (to be used by organizations such as the Internal Revenue Service and the Department of Defense), remote data base access and electronic data interchange. Industry gurus predict that GOSIP 3 and 4 should be finalized by late 1991 or early 1992.

Two OSI competitors

An overview of OSI standards would not be complete without a review of some of the important unofficial or de facto standards, which are developed by major vendors or user groups to fill a void until recognized standards are in place.

The most prominent of these de facto standards are IBM's Systems Network Architecture and the Transmission Control Protocol/Internet Protocol suite developed and maintained by the Internet Activities Board, a committee representing users of the giant Internet. One of the latest developments in TCP/IP is the Simple Network Management Protocol (SNMP), developed by the Internet Engineering Task Force (IETF).

SNA is quite mature, but IBM keeps upgrading it. For example, last June, IBM announced VTAM Version 3.0, which allows NETBIOS transmissions to be encapsulated in SNA envelopes so that they can be transmitted across SNA backbones. VTAM 3.0 also includes much improved support for OSI.

Similarly, in early March of this year, IBM extended its Advanced Peer-to-Peer Networking (APPN) protocol to its OS/2 microcomputers and to 3174 cluster controllers.

With an estimated 80% of Fortune 1,000 mainframes (including non-IBM mainframes) running SNA, it does not seem likely that IBM will lose its dominance for a long time — if ever.

Still, IBM's support for OSI is notable, as was the announcement that IBM's APPN specification will be published, which in effect turns it into another de facto standard. Most likely, IBM's NetView will also be upgraded to support OSI network management.

Recently, SNMP has made strong inroads into network management circles. Like OSI, SNMP uses object-oriented design principles, but the SNMP protocols are much simpler than the OSI protocols.

The IETF also sponsors an implementation of OSI, so the SNMP-managed objects have all been described using OSI management object specification techniques. Thus, SNMP is likely to be absorbed into OSI as a subset protocol as time goes on.

New optical standards

Some of the most exciting standards developments in the past year have involved fiber optics. Certainly, the optical network is the wide-bandwidth communications network of the future; all that remains is completion of the interconnection and protocol standards needed for such a system. As such, the synchronous optical network (SONET) standards governing future fiber-optic transmission systems and the supporting standards related to it will have far-reaching implications for networking in the '90s.

> Some of the most exciting standards developments in the past year have involved fiber optics.
>
> ▲▲▲

The CCITT developed the basic SONET standards in 1989. Since then, much effort has gone into refining the supporting optical standards so that SONET can be implemented in real systems. For example, the CCITT recently developed several new optical recommendations for the Synchronous Digital Hierarchy (SDH). These include G.955 and G.956, which define digital-line systems for use on fiber-optic cables in networks based on 1.5M bit/sec and 2M bit/sec synchronous hierarchies, respectively.

The aim of G.955 and G.956 is to achieve basic compatibility between different optical-line systems, a fundamental requirement before optical communications systems can become prevalent.

Similarly, CCITT's new G.957 recommendation provides specifications for SDH optical interfaces over a broad range of distances, while G.958 details the overall system aspects of digital synchronous optical-line systems.

Together, G.957 and G.958 define the parameters for setting up a local optical fiber communications network and enabling it to interconnect with similar networks via optical links. Both documents are now in the final draft stage and should be ratified by year end.

Other recent optical standards developments have come in the area of extensions to the Fiber Distributed Data Interface LAN. FDDI promises to meet the needs of optical LAN users in support of the dramatic increase in data rates needed for applications such as computer-aided design and image processing. The Computer and Business Equipment Manufacturers Association (CBEMA) X3T9.5 Committee, accredited by ANSI, is responsible for continued U.S. development of FDDI standards.

The original FDDI specification consisted of four parts: the physical-layer medium dependent (PMD) portion, physical-layer protocol (PHY), media access control (MAC) and station management (SMT). The first three parts specify the physical characteristics of the network; SMT specifies all of FDDI's built-in management services.

The committee is currently working on an update to the FDDI PMD specification to include single-mode fiber. And CBEMA X3T9.5 is also developing enhancements to FDDI that would specify compatibility and interconnection with SONET. Committee executives say these enhancements are likely to be finalized later this year.

Ongoing enhancements to FDDI's MAC and PHY layers include the introduction of hybrid ring control (HRC), a mechanism for supporting both asynchronous packet data and isosynchronous circuit-switched data on FDDI LANs. HRC allows real-time voice and video traffic to be integrated with packetized data on the same FDDI LAN. These enhancements comprise a new generation of FDDI called FDDI-II, which should be approved by late 1991.

The combination of FDDI and SONET is likely to have a significant impact on future high-speed network architectures. Network managers should begin planning for this now.

ISDN, MANs, ODA

CCITT Study Group XVIII made considerable progress last year in developing broadband ISDN ("Broadband ISDN, a standards update," *NW,* March 18). Tests of broadband ISDN system interoperability are scheduled for next year in Europe, Japan and the U.S.

In late 1990, the IEEE adopted the cell relay-based 802.6 standard governing metropolitan-area networks. This standard essentially completes the basic interconnection system for optical networks. Together with the other optical fiber communication standards (FDDI for LANs, broadband ISDN and SONET for WANs), IEEE 802.6 is likely to change the way corporations are wired.

Some of the more interesting standards developments in the

(continued on page 42)

Forthcoming modem standards

Modem standards are particularly important to networking. And products based on these standards will continue to be the workhorse of data communications until fiber optics or Integrated Services Digital Networks become ubiquitous.

In an effort to compete with high-speed digital technologies such as switched digital services and ISDN, modems are using recent discoveries in coding and modulation to take giant leaps in speed and performance. The Consultative Committee on International Telephony and Telegraphy is working overtime to standardize these newer high-speed techniques.

For example, in February 1990, the CCITT adopted a new data compression standard, V.42bis, which enables modems to transmit data at effective throughput rates of three or four times the actual data rate.

V.42bis can be used to enhance the throughput of any dial-up modem, with its use in V.22bis (2,400 bit/sec dial-up) and V.32 (9.6K bit/sec dial-up) modems becoming extremely popular.

With the potential fourfold compression of V.42bis, a V.32 modem operating at its full 9.6K bit/sec data rate may achieve an effective throughput of up to 38.4K bit/sec, a data transmission capacity previously unheard of for dial-up modems.

In a move to increase the data rate of the popular V.32 modem, the CCITT adopted V.32bis last month. V.32bis is basically a higher speed version of V.32, with the data rate bumped up to 14.4K bit/sec.

Although the standard was just approved, V.32bis modems are already available for sale.

According to market research from UDS Motorola, Inc., the most popular V.32bis modems appear to be those containing V.42bis. With V.42bis, these modems could offer throughput exceeding 56K bit/sec.

The CCITT is now working to standardize a full-duplex dial-up modem that could achieve raw data rates of 19.2K bit/sec or more. Dubbed V.fast, this modem will take advantage of the latest in modulation technology.

The CCITT hopes to have this standard completed by the end of next year.

If it achieves its goals, V.fast will put high-speed modems in the fast lane along with ISDN, ensuring their continuation for many years.

As 1992 approaches, the European Telecommunications Standards Institute (ETSI) is working quickly to establish a common set of modem requirements for products entering Europe.

The ETSI NET 20-NET 25 modem standards are just now being finalized, with publication expected by summer. These standards set requirements for 300, 1,200, 2,400 and 9.6K bit/sec dial-up modems, as well as quality standards for telephone lines. They are compatible with the CCITT standards governing modems but demand additional features unique to the European telephone network.

These standards are likely to be important not only to manufacturers that want to sell modems to the European market, but also to anyone who travels to Europe with a modem or to any organization with Europe-U.S. modem communications.

— Steven Turner

Whenever you make a change in your LAN, the problems you foresee will not be the ones that occur.

—*Murphy's Law, v.1.3*

Important network standards organizations
Figure 1

Organization	Area of specialization	Sphere of influence
ANSI	Electronics and industrial issues	U.S.
Computer and Business Equipment Manufacturers Association	Computers and business machines	U.S.
CCITT	Telecommunications, data communications, telephone and telegraph issues	International
Electronic Industries Association/Telecommunications Industries Association	Electronics, communications, computers and interconnections	U.S.
European Computer Manufacturers Association	Computers and related technology	Europe
European Telecommunications Standards Institute	Telecommunications and data issues	Europe
Exchange Carriers Standards Association's Telecommunications Committee 1	Telecommunications and data communications	U.S.
Subcommittees: ■T1E1	■ Digital networks and interconnection	
■T1P1	■ Personal communications	
■T1S1	■ ISDN	
IEEE	Applications-oriented communications	International
International Standards Organization/International Electrotechnical Commission	Data communications, network management and information processing	International
NIST	Communications and regulatory issues	U.S.

GRAPHIC BY SUSAN SLATER SOURCE: UNIVERSAL DATA SYSTEMS, INC., HUNTSVILLE, ALA.

(continued from page 40)

past year have occurred in the area of Office Document Architecture (ODA). The European Computer Manufacturers Association (ECMA), ISO and CCITT committees have worked together to create a common document interchange format that can be readily used by all word processors.

For two incompatible word processors to exchange a document, the document is first translated from its native word processing format into the ODA format. That ODA document can then be translated directly into virtually any other word processor format.

In September 1990, extensions were added to the ODA standards (ISO 8613, CCITT T.410 and ECMA-101) to accommodate color, style variations and file security. Currently, the CCITT and ISO are working to add enhanced data capabilities such as improvements in formula, spreadsheet and business graphics manipulation.

Wide vendor acceptance of ODA is soon expected to make document transfer via corporate and public communications networks commonplace. Siemens Communications Systems, Inc. and Xerox Corp. already have ODA products on the market that conform to the late-1989 version of the ODA specifications. Other companies, such as Digital Equipment Corp. and Honeywell Bull, Inc., have announced the imminent release of ODA converters.

In addition, IBM plans to include ODA in its Systems Application Architecture and OfficeVision products soon. By November, more than a dozen Japanese firms, such as Hitachi, Ltd. and Oki, anticipate such products.

Besides several important new modem standards (see "New and forthcoming modem standards," page 40), other new wireline communications standards are also being developed. Among these is a CCITT effort to develop a 56K/64K bit/sec standard for non-ISDN digital leased lines. Currently called V.dlc, this standard will help provide compatibility among digital data services worldwide. Ratification of this standard may come by mid-1992.

Another new CCITT project should provide network service identification for voice signals, facsimile machines and data modems. This standard will allow modems, voice telephones and fax machines to be connected to the same telephone line and require the network to signal the proper device when a call is made. Currently at an early draft stage, this standard should be complete by late 1992.

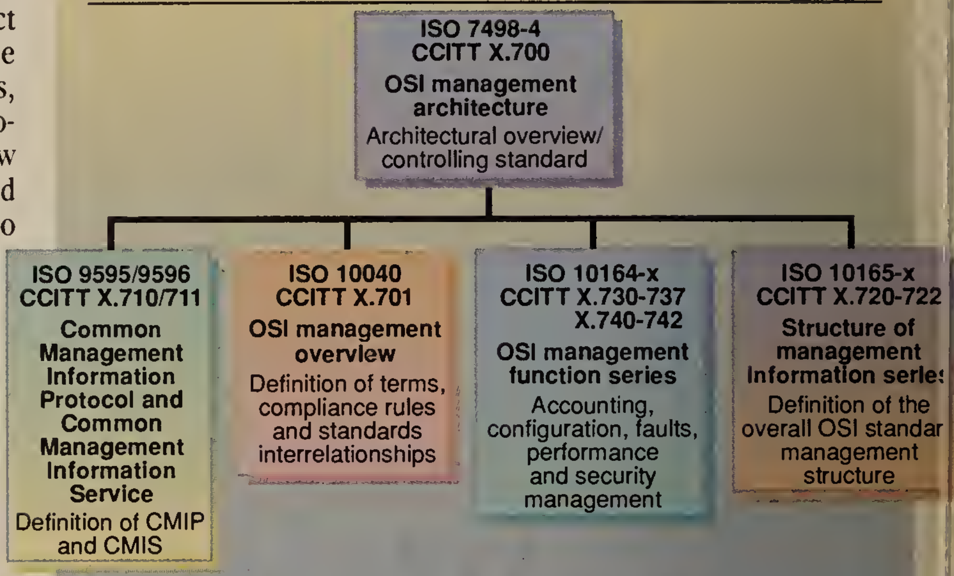
ISDN standards for use on the existing copper wire continue to evolve. For example, CCITT T.90, which deals with the interface between ISDN's communications services and OSI's networking interfaces, is scheduled for final approval by mid-1991.

T.90 covers ISDN circuit-switched and B-channel packet-switched definitions and provides interworking between ISDN and OSI Network Service. This standard could have a significant impact on how ISDN/OSI network connections are made.

Two ISDN terminal adapter standards, V.110 and V.120, are also being updated. Both are rate-adaption standards, but V.110 uses asynchronous framing, which is popular in Europe, while V.120 uses High-Level Data Link Control, which is supported in the U.S.

A new draft of V.110 will improve frame synchronization. The updated V.120 standard will support V.25bis dialing and control functions. An option to use inband signaling is also under consideration for V.120.

OSI management architecture standards
Figure 2


ISO 7498-4
CCITT X.700
OSI management architecture
Architectural overview/ controlling standard
ISO 9595/9596
CCITT X.710/711
Common Management Information Protocol and Common Management Information Service
Definition of CMIP and CMIS
ISO 10040
CCITT X.701
OSI management overview
Definition of terms, compliance rules and standards interrelationships
ISO 10164-x
CCITT X.730-737
X.740-742
OSI management function series
Accounting, configuration, faults, performance and security management
ISO 10165-x
CCITT X.720-722
Structure of management information series
Definition of the overall OSI standard management structure

The OSI management architecture standards form the basis for international network management system interoperability, providing a means to manage not only the hardware and software in communications networks, but the data within the net as well.

ISO = International Standards Organization

GRAPHIC BY SUSAN SLATER SOURCE: UNIVERSAL DATA SYSTEMS, INC., HUNTSVILLE, ALA.

Clearly, the networking technology experiencing the most explosive growth today is wireless networking. Radio frequency

(continued on page 44)

Other new standards that affect networking

In addition to the numerous major net standards, many other new standards affect the business of networking in some way. These may be related to computers, software, existing networking techniques or some other seemingly unrelated technology.

For example, the Open Systems Interconnection/Network Management (NM) Forum, a consortium of companies interested in making OSI network management products, has recently developed an OSI Management System-to-Management System Interface standard. It should allow incompatible management systems to interwork more effectively.

The OSI/NM Forum has also approved an addendum to an IEEE standard that defines methods for cooperative management of computer system resource information. In another important standards activity, the OSI/NM Forum is working with government personnel to integrate some of their network management concepts into the Federal Information Processing System Government OSI Profile standards.

With regard to network accessing procedures, the Electronics Industries Association/Telecommunications Industries Association (EIA/TIA) has just approved EIA Technical Systems Bulletin 32. That contains information on how to implement private networks for interconnecting digital private branch exchanges and for connecting a PBX to the public switched telephone network.

CCITT H.261, an interesting new videoconferencing standard, provides uniform methods for decoding video signals sent over a network. The data rate may range between 64K bit/sec to 2.048M bit/sec, with the picture quality being directly proportional to the data rate. This new standard is likely to increase the use of all network types to transmit high-quality video and image data.

The European Committee for Standardization and European Committee for Electrotechnical Standardization have jointly approved the Standard Generalized Markup Language (SGML) and the SGML Document Interchange Format.

The scope of these standards is to provide an abstract definition for binary encoding, with bidirectional convertibility between binary and clear-text encoding. That provides an efficient way to represent markup in information bases with particular reference to hypertext and hypermedia facilities.

In a related area, new draft standard Z.3950, issued by CCITT Study Group X, defines an information retrieval protocol. That specifies standardized methods for accessing and retrieving information via electronic data bases. Only time will tell whether the world's data base and bulletin board systems will conform to the new standard; if so, it could go a long way toward simplifying the use of multiple data bases.

In the meantime, the ANSI X3 Committee, which is responsible for information processing systems, is working to enhance the interface side of computer communications. The group has just released Revision 10-C of its Small Computer System Interface 2 (SCSI-2). This revision provides a more efficient peer-to-peer I/O bus, connecting as many as eight devices, including hosts.

An issue that directly affects network efficiency and capacity is the use of data compression techniques for international communications. Of interest in this area are several new CCITT standards for circuit multiplication, which is a form of standard data compression for telephone companies that ensures that a circuit is not compressed more than a specified number of times.

The G.763 recommendation, approved last December, defines compatibility information between digital circuit multiplication equipment (DCME) using 32K bit/sec adaptive differential pulse code modulation and standard digital circuit multiplication techniques.

G.764, which is a companion recommendation, provides similar information for packet circuit multiplication equipment (PCME). It defines requirements for voice information in its voice packetization/packetized voice protocol. Both G.726 and G.727 define, respectively, the DCME and PCME encoding algorithms. And the CCITT is currently considering a new draft recommendation, G.PCME, designed to add data compression for facsimile communications.

Even seemingly mundane standards often can affect networking and, therefore, merit close observation. For example, the EIA/TIA 569 standard, approved in late 1990, defines commercial building standards for telecommunications pathways and spaces, including specific design and construction practices within and between commercial buildings. The purpose is to standardize building methods and arrangements in order to optimize the efficiency of communications networks in buildings and to reduce noise and interference from external sources.

— *Steven Turner*

The time it takes to
pinpoint a LAN problem is directly
proportional to its gravity.

—Murphy's Law, v.1.7

Standards that matter

continued from page 42

(RF) LANs, private RF networks and the personal communications network/universal personal telecommunications (PCN/UPT) concept have thus far developed without standards. But this situation is now changing.

The Exchange Carriers Standards Association Telecommunications Committee 1 has established a new technical subcommittee, T1P1, to develop standards for PCNs. T1P1 will initially concentrate on address service definition and architectural issues that affect the network aspects of UPT. T1P1 will be the primary U.S. contributor to similar work going on at the international level in CCITT Study Groups I, II and VII.

Study Group I has just developed a new draft recommendation called the Principles of UPT, or F.PUPT, which spells out such basic requirements as global access procedures for UPT facilities, personal mobility requirements, billing systems and subscriber authentication. F.PUPT is designed to work with another new draft recommendation, the Service Requirements of UPT, or F.SUPT, which provides a detailed description of UPT facilities. Meanwhile, the ECSA T1E1 subcommittee is also starting work on personal communications in the context of wireless network access to the existing wireline network.

Wireless LANs have begun springing up rapidly during the past year in mobile RF networks and indoor wireless networks. The IEEE 802.11 subcommittee has been formed to develop standards for these networks, as well as standards for communicating between traditional wireline LANs and the new wireless LANs.

In addition, CCITT Study Group II has just approved Recommendations E.201 and E.220, which deal with the definition of mobile communication services and interconnection of land mobile systems, respectively.

Although the wireless standards are just now taking shape, this effort will eventually allow wireless networks to tie directly into the global network of ISDN, optical and satellite communications. Thus, the emergence of RF access systems will soon have a significant impact on network management and planning.

Standards from everywhere

This brief tour through today's emerging standards paints a vivid picture of how difficult it is for networking professionals to keep track of all the standards that affect them. And the task of keeping up with standards is likely to grow tougher as new technologies unfold.

Still, each new standard also represents an opportunity to improve networking capability. Network managers should, therefore, make it a priority to stay abreast of the latest in standards activities. ◘

Some vendors think standards are all you need to build an open network.

BBN would like to poke a few holes in that theory.

Computer and network vendors tell you that with standards, you can connect anything. But you know it's not that simple.

BBN Communications has designed, built and supported multivendor networks for more than 20 years. We've learned there's a lot more to networking than standards. Here are a few of the reasons:

1. Standards are not always so standard.

Vendors may all support the same standards, but that doesn't assure their products are interoperable. The fact is, you need highly specialized knowledge and experience to integrate even a standard network. At BBN, we've built numerous open networks integrating every leading vendor – including IBM, Sun, Hewlett-Packard, Digital and others.

2. Your existing equipment may not be standard.

Even if the latest standards work perfectly, you still have your existing computers to think about. After all, many people are using them productively. That's why BBN supports a wide range of standard and vendor interfaces, such as async, bisync, X.25, SNA, TCP/IP, DECnet™, Novell IPX™, AppleTalk®, and emerging OSI standards.

3. How are you going to manage it all?

Network management standards are just beginning to appear. That's why integrated networks still remain elusive for many organizations. At BBN our network management system is based on an open architecture that supports both your old *and* your new systems. And it's OSI-compliant for the future.

4. Don't forget about next year's standards.

You'll face the same challenge every year – new standards will have to be incorporated into your existing network. BBN has plenty of experience in upgrading and maintaining networks over long periods of time. In fact we helped design and build the world's longest-running internetwork.

There's a lot more to consider in networking. That's why BBN has put together the "Networking Knowledge Series," a collection of interviews and articles from some of the leading experts in the communications industry. The series will give you valuable insights into the trends and issues that are shaping networking in the 1990s. To receive your free set, please call today.

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Networks Built on Experience

Con

continued from page 35

need to make their nets better.

- **Licensing is unnecessary because it is an insult to users.** I believe in consumer protection as much as the next guy. But when it comes to the advice business, we're all grown-ups. Users are capable of deciding for themselves where they should get their business advice without the government interfering.

Users can select the consultant with whom they want to work by using the three R's — resume, references and rapport. Simply stated, a consultant should be able to provide a demonstrable ability to perform the project at hand while communicating clearly with the client.

The consultant's resume should include a precis of the person's experience in the industry. What experience do they have that indicates an ability to perform? In addition, do they demonstrate this knowledge in other ways — through writing articles, lecturing or teaching? Are they full-time consultants or "just passing through?" If you look closely, you can tell.

We're talking about demonstrable evidence of experience; either you've got it or you haven't. And a license doesn't automatically give you experience.

In addition, references are more important than a license. When evaluating them, ask: Did the consultant do what was promised? Did they do it for the promised fee? Was the client happy with the results?

The sense of rapport between a consultant and client is vital to any successful engagement. It can't be licensed, and you can't use credentials to check on it. But unfortunately, it is the one area where a consultant/client relationship can be derailed easily.

- **The communications industry needs less, not more, regulation.** We've got restrictions on the regional Bell holding companies, which could be the most effective information distribution mechanism in the world. We also restrict who can carry calls and information (local exchange and interexchange carriers). To top it all off, we limit where they can carry those calls and information. Now we want to restrict who can tell us how to use this restricted technology.

It's time to back off. Those in the communications industry should spend their efforts on ways to expand this wealth of information and knowledge, which are vital business tools, instead of looking for ways to squelch creativity.

Users should use credentials, experience and references to decide who is most capable of providing advice. ◘

Your most crucial new project will always need Token Ring if you already have Ethernet installed.

—Murphy's Law, v.1.8

Net to help IRS nab tax evaders

continued from page 1

"We currently don't have the degree of interactive processing that's required to properly complete collection procedures," said Raymond Keenan, IRS collection commissioner. "When completed, the project will exponentially increase worker productivity in our collection/enforcement branch."

Today, tax returns filed with the 10 IRS service centers throughout the country are forwarded to IRS headquarters in Martinsburg, Va., for processing. At the data center there, the agency maintains data on all taxpayers.

Any returns the IRS deems problematic — such as those with inadequate information or outstanding payments — are returned to the service centers for handling. Host data bases at the service centers maintain data on taxpayers who owe the IRS money or fail to submit returns.

In addition, the IRS maintains 20 call sites nationwide that take over accounts after notices from IRS service centers fail to secure payments. The call sites are equipped with automated dialing systems that call problem taxpayers and hand the calls off to agents. The dialing systems are linked to mainframes with information on delinquent accounts.

Accounts that cannot be cleaned up by the call sites are handed to revenue officers at one of 63 district offices throughout the country, who then personally visit taxpayers. These offices are not tied into processors at the call sites or service centers, so the more than 9,000 revenue officers at these facilities must request paper documents on taxpayers.

Since collection agents must pull information together from various sites, data input and retrieval often takes several weeks, making collection efforts slow and unreliable.

Improving efficiency

When ICS is completed, agents will be able to access all the information about a taxpayer from a workstation or portable computer. That will dramatically improve agent efficiency and ease headaches for taxpayers, who will not be repeatedly asked for data the IRS already has. It will also eliminate redundant bills and notices.

Account updates — such as payments, liens, levies and closings — will also be made on-line so collection employees can access the most current data.

"The revenue officer will be able to get information on a taxpayer in one fell swoop and not have to return to the same taxpayer at a later date concerning another matter," said Andrew Meranda, ICS project manager.

The ICS project calls for the installation of new IBM 3090 mainframes at each of the service centers that will maintain all the information on collection efforts in IBM DB/2 data bases. The hosts will be connected to LANs in the centers supporting IBM Personal System/2 workstations.

The mainframes are scheduled to be installed at service centers by 1993, starting in Memphis, Tenn., in mid-1991.

Agents at the call sites and district offices will be able to access service center data bases from their workstations, which will be on Ethernet LANs equipped with gateways. The LANs will communicate with service centers through the Consolidated Data Network, the Treasury Department's X.25 packet-switched network. All mainframes at the call sites will be removed.

Revenue officers will be equipped with laptops to access the service center data bases, enabling them to work more effectively while visiting taxpayers and to avoid carrying along a myriad of written documents.

Fourfold increase

Keenan estimated that ICS will provide a fourfold increase in the number of cases completed by each collection agent and revenue officer.

"ICS will vastly speed up the entire collection process since paper cases will no longer be manually transferred between the service centers, call sites and field offices," Keenan said.

The quality of the entire collection function will also be improved, he said, through better overall inventory management and reduced manual errors.

Letters

continued from page 35

empted any military action; therefore, his death left his wife and three children in a troubling financial position. Those who knew John have set up a fund to help give back a little something in return for all that John gave us.

We would like to request that everyone in the industry open their hearts and help take care of one of our own. A bank account has been set up to receive donations at the following address: Klein Bank, John Gordon Memorial Scholarship Fund, P.O. Box 73249, Houston, Texas 77273, Attention: Peggy Coleman.

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Pro

continued from page 35

rely on the suppliers' engineers, a recourse that shortchanges the user.

Consulting engineers who specialize in communications are trained to transport systems and concepts from other applications in order to solve user network and system problems. They have the experience to specify, coordinate and integrate a total communications network project.

Licensed professional engineers are prepared to deal with federal, state and local codes, as well as electrical service and fire code requirements. They can also seal the necessary documents to protect the interests of their clients. Professional engineers are the trained, knowledgeable and experienced consultants that users need on their side of the table.

In accordance with their code of ethics, which is as binding for them as a lawyer's or a doctor's, professional engineers do not align themselves with equipment and network vendors to act as their integrators. They do not sell software solutions, nor do they profit by their client's purchase of one system or another.

Professional engineers, by their code of ethics, cannot represent both a user and a vendor simultaneously on the same project. These engineers are the user's technical and design representatives, bound to protect that user's interest to the best of their ability at all times.

The purpose of the professional engineering license is not to provide a competitive edge, but to protect the public's interest. Professional engineering licenses are not given out as political rewards or by pressure from large companies.

On a national scale, the professional engineering license is obtained only after the satisfactory completion of a 16-hour state-administered written examination. Before taking the exam, engineers must submit extensive documentation to determine whether they are eligible to take the test. Verified documents must be provided indicating graduation from a four-year engineering school (accredited by the Accreditation Board for Engineering and Technology), as well as approximately four years of qualified practice.

The purpose of the license is not to provide an edge, but to protect the public's interest.

▲▲▲

In most states, the professional engineering license exam includes a portion on electronics and electrical engineering, of which communications is a branch. The standards for these exams are developed by the National Council of Engineering Examiners, which began developing standards for engineering professionals long before it became popular to be a communications consultant.

Professional engineers offer the public and their clients an added level of responsibility for the designs and specifications they provide by being personally responsible through their license long after the project is complete. This eliminates the concern about the consultants going out of business.

Many users are concerned with kickbacks, sale of software systems and other unprofessional activities of consultants. It should be a source of comfort to learn that in a recent survey by a national news magazine, engineers came out on top of all other professions for ethical practice.

My recommendation to users when selecting a consultant is to start by looking at the person's credentials, licenses and degrees, and then look for actual completed projects and past clients that can relate their experiences. While the professional engineering license does not ensure the highest quality, it provides confidence in the person's technical level of training and responsibility. It then sets the client on the interactive process to find a consulting engineer with the right fit for the project.

Without the professional engineering certification, all you have is an individual with self-proclaimed experience who may know only enough to be able to stay half a step ahead of you.

Firm moves applications

continued from page 25

tially committed to expanding the mainframe.

Kenneth Millsaps, Rogers Group's senior vice-president of operations who chairs the steering committee, said he finally agreed that "smaller is better" and that decentralization would produce more strategic benefits.

Gmitter's "proposal was a major change in company direction because I had been carrying the mainframe flag for so long and was now being asked to throw that flag away," Millsaps said. The committee decided to support IS' strategy after it was shown that the new platform would allow systems to be brought up more quickly and less expensively, he added.

Two years ago, all processing was performed on the 4381 host and only 13 of the 32 field sites were hooked up to the machine. All other sites had either standalone personal computers or manual systems.

Now three applications have been taken off the mainframe and moved out to Unix personal computers at the remote sites — including payroll, point of sale and a truck scale application, which measures the weight of a truckload of rocks and bills the customer accordingly.

Mainframe utilization is now only slightly above 50%. The freed capacity will allow Gmitter to downsize to a smaller 4381 host, saving $100,000 in purchasing costs alone.

Multiuser Unix-based personal computers have been installed at the 32 field sites, with multiple terminals hanging off of each.

Under the new architecture, four of six leased lines were removed and replaced with dial-up lines, which can accommodate the short, 15- to 30-minute bursts of transmission activity from field locations to headquarters.

"What's key is that we're building our systems around a very simplistic data communications network," Gmitter said. By removing the leased lines, IS has so far saved $75,000 — including the cost of the additional dial-up service.

Since the company's core business activities are performed at the field locations, it is critical for field operation managers to have timely information about equipment, labor, production and sales. Gmitter said putting the processing power in the fields had enabled the managers to obtain relevant data more quickly and, hence, make better informed decisions.

"The aim is to develop systems that capture data at its source, capture it once and make the end user responsible for it," he said.

Cost reports for construction and aggregate sites, for instance, previously were sent to the Nashville headquarters for processing and returned to field sites — a procedure that typically took as long as two weeks to complete. Under the new architecture, the reports are processed on the Unix computers at the given site and the manager obtains the needed information the following day.

Gmitter is now beginning a companywide downsizing effort in which all applications will be handled remotely.

Future systems applications will demand greater infrastructure changes than the current three remote applications required, such as installation of local- and other wide-area network facilities, security standards and network management. Once these are developed, Gmitter said, all applications will be handled remotely and the host platform eventually removed.

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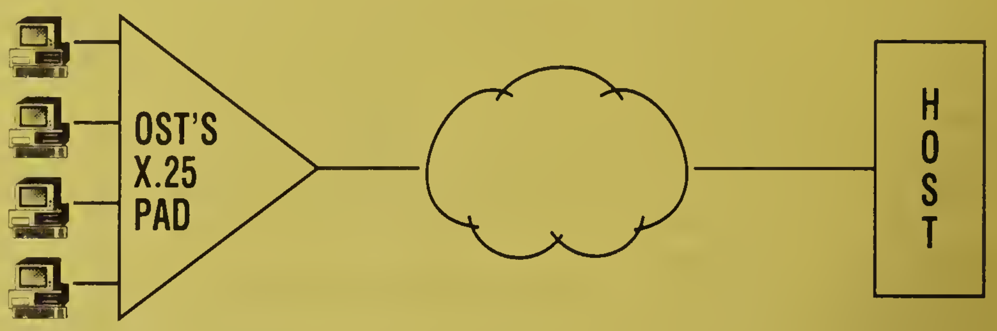

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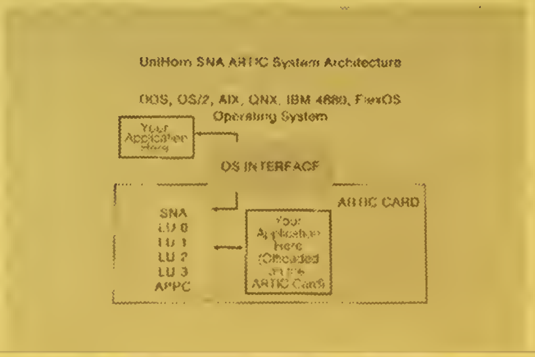
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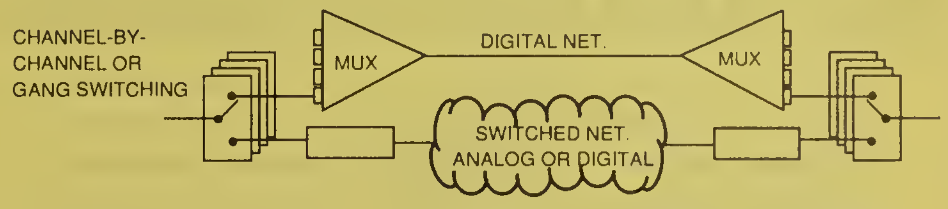

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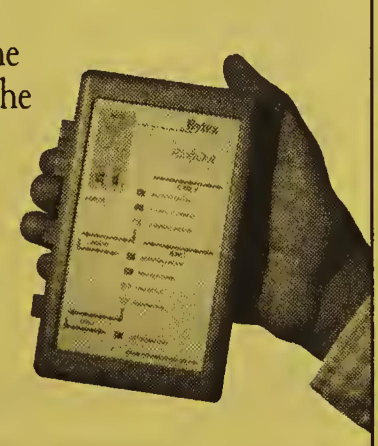

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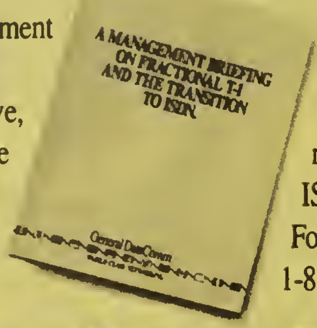
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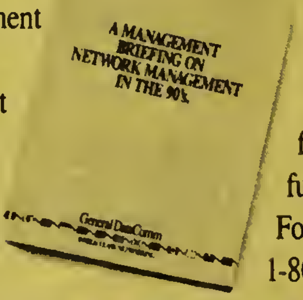

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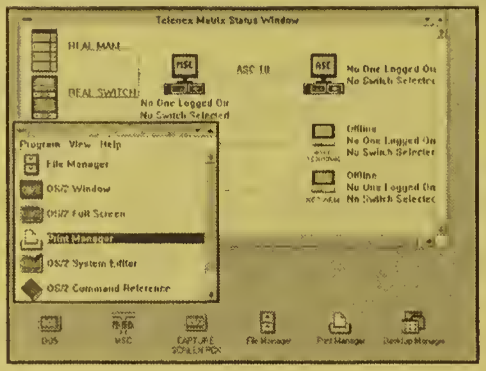

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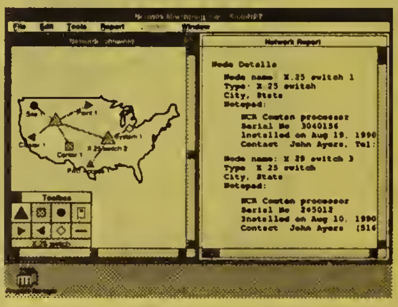

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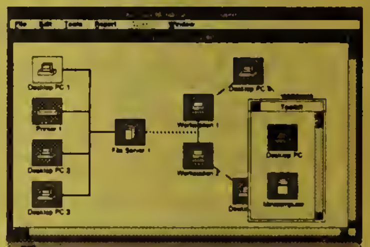

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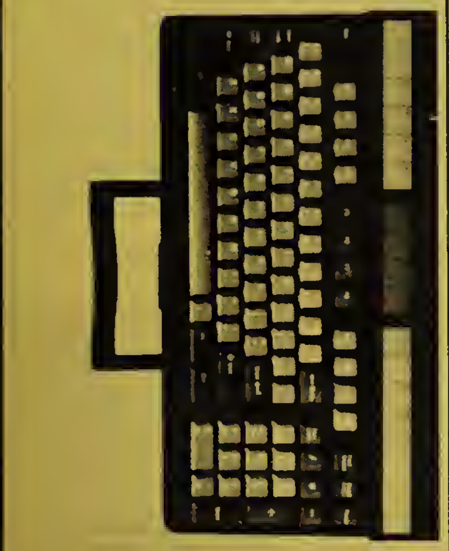

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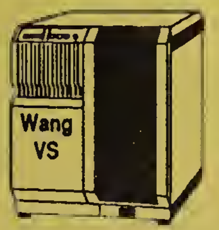

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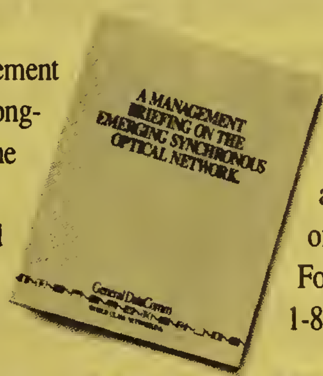
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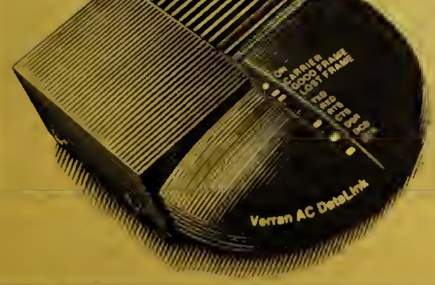

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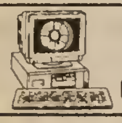

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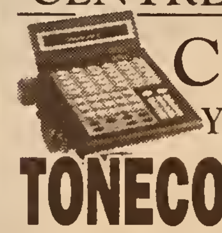

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1. Buyer's Guide: Bridges/routers
2. Survey: Critical issues facing users

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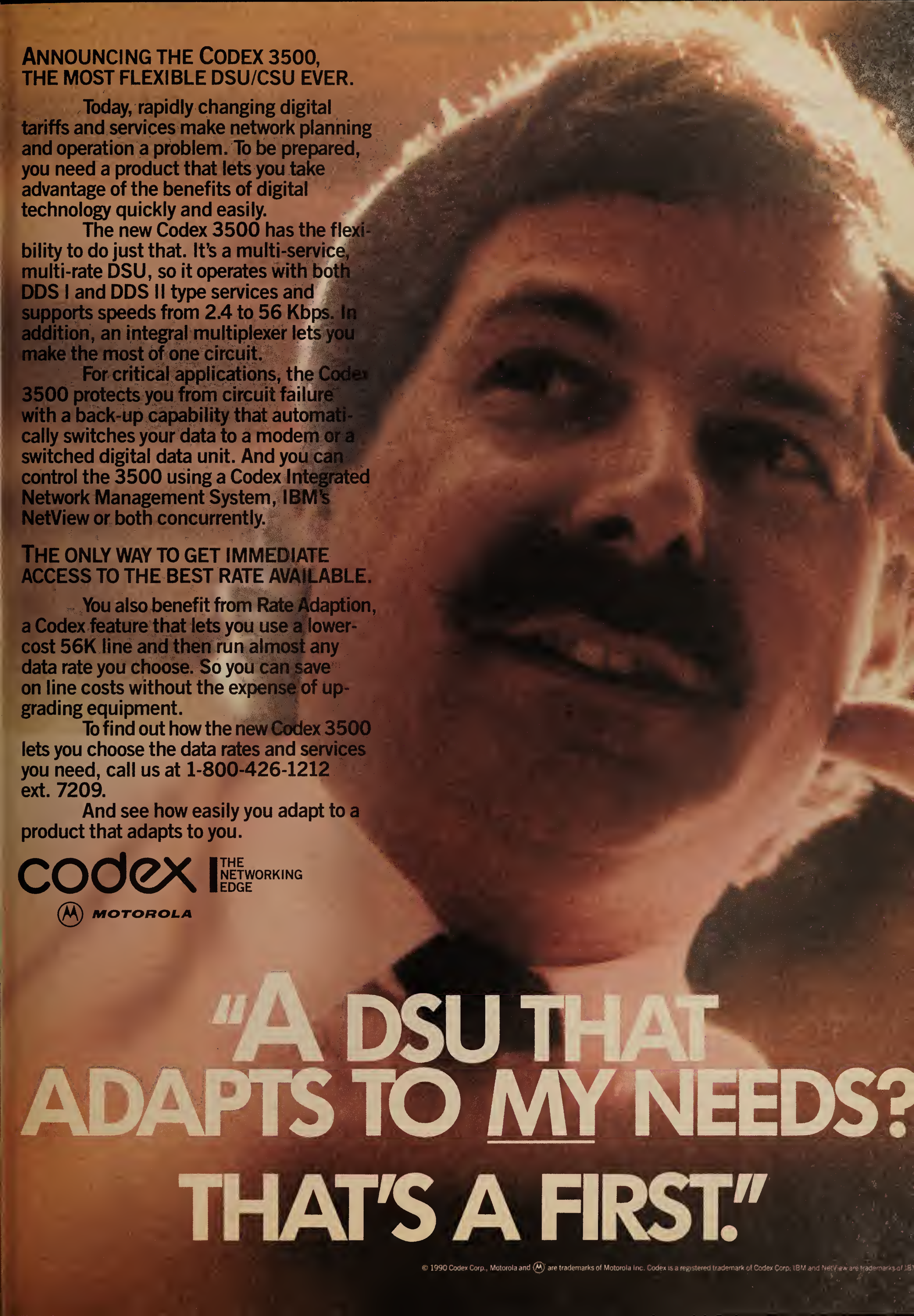
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AT&T resets SDN, SDDN rates

continued from page 1

ing its volume discount plan for a feature known as Network Remote Access and increasing rates for off-network SDDN calls by nearly 12%.

An AT&T spokesman said the higher SDDN rates "better reflect the value of the service."

New SDDN feature

AT&T also rolled out a new SDDN feature that allows users to transmit data or video at 384K bit/sec. It will initially be available in 138 locations beginning May 24. Previously, SDDN was available only at 56K and 64K bit/sec speeds.

Analysts said AT&T's rate changes for SDN are intended to drive resellers off SDN and onto its Distributed Network Service (DNS), a new offering launched last month specifically for resellers.

The main areas targeted for price increases — switched access and off-peak calls — are those most likely to affect resellers, said Daniel Briere, president of TeleChoice, Inc., a consulting firm in Montclair, N.J.

Bob Self, an independent consultant in New York, agreed. "AT&T is clearly trying to discourage off-peak use of SDN probably because resellers would make more calls during that period than corporate customers."

AT&T rolled out a new SDDN feature that allows users to transmit data or video at 384K bit/sec.

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The spokesman denied that AT&T is trying to drive resellers away from SDN but added, "SDN is targeted at business customers, and we would like to keep it that way."

Briere said AT&T wants to make things unpleasant for resellers under SDN because they might balk at moving to the new DNS tariff. SDN volume discounts are higher than those offered under DNS, he said.

Heavy resale was a key reason AT&T began to have trouble with billing and order entry for SDN, Self said. Moving resellers off the service should be beneficial for users.

"SDN is just not designed for a lot of churn and a lot of new sites being added in the provisioning process," he said.

SDN requires too much administrative work and offers many features that resellers never use, Self said, so DNS should be a much better option.

IBM fleshes out SystemView plan

continued from page 1

according to Howell.

- SystemView message traffic will be in the form of data units structured according to the OSI Common Management Information Protocol (CMIP). This marks a radical departure and evolution from NetView's current proprietary and nonstandard message formats.
- Management information within SystemView will be in the form of several hundred objects, most to be specified by IBM. This is a departure from the data structure of today's NetView. IBM says it will publish the first SystemView data-object specification by year end.

"I'm not buying into SystemView until I know what I have to buy," said one user.

▲▲▲

IBM managers interviewed were uncertain whether the increasingly popular Simple Network Management Protocol (SNMP) will be formally supported within SystemView. IBM, however, just threw some support behind SNMP with the recent delivery of software products for MVS and VM mainframes, which enable IBM NetView hosts to manage SNMP networks.

But this and other uncertainties are making users cautious.

"I'm not buying into SystemView until I know what I have to buy," said an MIS senior vice-president with a New York-based insurance company who requested anonymity. He and other users expressed increasing skepticism about IBM's ability to assuage its large customer base with "vague, undefined architectures that require multiyear commitments."

The few SystemView details released last week were doled out at a New York press briefing, which observers agreed was staged to head off an expected poor first quarter financial report that is scheduled to be released late Friday. IBM executives in attendance at the briefing would not discuss the company's financial results nor would they offer many more details about SystemView.

In discussions with different IBM managers, it appears that many questions regarding SystemView, especially regarding a migration path from current NetView management environments, remain to be answered. "We're working toward conforming with OSI standards, but it won't happen next week," said IBM's Howell.

Some SystemView details, however, have surface in two recently released IBM documents. One of these, SystemView Concepts, states its purpose is "to help business and data processing professionals evaluate SystemView." The 100-page document never mentions either SNMP or NetView, however. Nor are any specifics offered concerning which existing application program interfaces would be supported in future SystemView environments.

SystemView "will incorporate a combination of accepted standards, as well as [IBM-specified] extensions to those to include provisions for existing interfaces," says Mary Szabat, IBM advisory planner for network management systems in Research Triangle Park, N.C.

Szabat said she could not elaborate on specifics, nor would she speculate about what portion of SystemView she expected would be based on OSI standards and what portion would remain IBM-specified. No one interviewed at IBM knew if SNMP would be formally supported within SystemView.

Migration to SystemView is a key issue for users because the object- and OSI-based nature of SystemView represents such a radical shift from current IBM NetView- and SNA-based environments. In the absence of hard details, third-party vendors are continuing to introduce new products for IBM network management that employ NetView's current program interfaces and message and data structures.

IBM has indicated in statements of direction that it intends SystemView to be able to accommodate any third-party system that incorporates an OSI-compliant "agent" that issues messages to and responds to commands and queries from an OSI-compliant "manager."

It is still unclear what specific application interfaces will be supported, which are necessary for future SystemView environments to exchange management information with other, non-IBM managers.

IBM and AT&T recently announced that they would jointly undertake to deliver this capability to AT&T Accumaster and IBM SystemView customers ("IBM, AT&T join hands in net management," *NW*, April 1).

Virus breaks out on 3Com's net

continued from page 1

disabled the company's LAN internetwork of bridge/routers, segmenting the network and yet containing the virus. Porter declined to disclose how many LANs were affected.

Once the virus was isolated around noon, LAN personnel took down affected portions of the net and physically checked each node. During their inspection, LAN personnel deleted all files that appeared to have been tampered with or exceeded normal file sizes.

Instead of taking down the entire network at once, net administrators opted to shut down individual LANs in phases, so the entire campus network was never fully down, Porter said. Only 25 workstations on the network were affected, thus the task of purging infected files was not substantial.

Porter said they could have been dealing with a major network catastrophe had the net staff not acted so swiftly to identify the virus and contain it. Furthermore, backup copies of all files that were deleted enabled net personnel to restore files to their original state, so 3Com did not incur significant data loss from the attack.

Although many users had the impression the whole net was idled by the virus, there was never a time when all nine LANs were inoperable.

Porter emphasized that the virus did not infect any engineering or code-production networks.

Porter also said that although the company maintains a global network with customers and sales offices, the virus did not spread to those users because their wide-area net connections into 3Com's campus terminate on a separate LAN for security purposes.

At press time, 3Com did not know how the virus had entered the network. The staff, Porter added, is still gathering information to find a pattern, and determine where it started and how it spread.

Porter said the characteristics of the virus that hit 3Com matched those associated with the Jerusalem virus, which is one of the most widespread viruses and has more than 20 different strains, according to David Stang, director of research at the National Computer Security Association in Washington, D.C.

The Jerusalem virus is programmed to replicate itself and attach to any executable files. The virus is not activated until the file it's attached to is run, upon which it corrupts files or hampers the computer's ability to boot.

Be prepared

Last week's episode was the first experience 3Com has had with a virus penetrating its network, Porter said, adding that the company was not unprepared. He said the company had a plan in place, which had been rehearsed periodicaly, in the event a virus infected the company's network.

"We dealt with it successfully," Porter said. "The advice I'd give other users is be prepared. Don't let it be a surprise; get it early."

BOC offers NetView link

Bell Atlantic Software Systems in Princeton, N.J., is expected next month to unveil a unique network management system that serves as a user interface back end to an IBM host-based NetView network management system.

The IntelliManager, a Unix-based software package designed to run on an IBM RISC System/6000 computer, applies expert system intelligence to information extracted from the NetView host, processes and filters all the network management information, and then presents NetView information to the network operator via an organized, graphical interface.

According to Brian Cafferty, Bell Atlantic's general sales manager for the product, IntelliManager is one of the first to use the NetView Program-to-Program Interface (NPPI) for the exchange of Systems Network Architecture configuration and alert information.

NPPI, a standard part of NetView, is designed for network information sharing by other IBM host-resident applications.

By using this type of interface to support a remote standalone system — linked via a 9.6K bit/sec Advanced Program-to-Program Communications connection — the IntelliManager system remains tightly coupled with NetView but also has the autonomy to support additional network management features.

Cafferty hinted that IntelliManager, which is expected to cost $50,000 to $100,000, is likely to be enhanced with modules that add considerable capabilities to NetView.

These could include direct access to telephone company-maintained management data on user's switched and dedicated circuits, which are not manageable today by NetView; as well as management modules for portions of the customer's enterprisewide net.

— *Edwin Mier*

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Unisys offers network wares for U 6000 line

NEW YORK — Unisys Corp. last week introduced a version of AT&T's LAN Manager/X software and some enhanced communications products for its Unix-based U 6000 processors.

LAN Manager/X for U Series will let U 6000s act as file, print and application servers for DOS- and OS/2-based microcomputers on an Ethernet. The package includes Unisys' PC-to-Unix terminal emulation software, which enables microcomputers to emulate Digital Equipment Corp.'s VT-100 or Unisys' UTS-10, SVT 1220 or UVT 1224 terminals and costs between $1,995 and $4,795 for U 6000s equipped with a single processor. LAN Manager/X for U Series is scheduled for availability in June. Unisys also announced NetWare Systems for U Series software for multiprocessor U 6000s. A version of single-processor U 6000s is already available. The software is Unisys' version of Novell, Inc.'s Portable NetWare. It costs between $3,495 and $7,995, and is expected to ship between May and the fourth quarter.

Also released for multiprocessor U 6000s were versions of existing IBM connectivity tools, including new Systems Network Architecture Advanced Program-to-Program Communications software that enables U 6000s to establish LU 6.2 links with IBM systems (priced between $1,800 and $2,700); SNA Distribution Services software that enables U 6000s to transmit files to IBM systems (priced from $2,500 to $3,750); and SNA X.25 software that makes U 6000s appear to an X.25 network as an IBM physical unit Type 2 device (priced from $3,000 to $4,500). All packages will ship in May.

Unisys' Open Systems Interconnect Remote User Agent software and Simple Network Management Protocol agent pack for single processor U 6000s are slated for June availability. ☐

Unisys unveils OLTP software

continued from page 4

2200 mainframes, respectively, and load them into OnLine.

Murphy said Navy personnel currently must call people in other regions to locate out-of-stock parts. With Open/OLTP, an application in one region could query data bases in other regions to find a part.

George Germann, national director of MIS for Ernst & Young, a New York consulting firm, said his firm's regional offices have local-area networks equipped with data base servers that handle billing and track available consultants for assignments.

The firm may run Open/OLTP on those servers to automatically query other servers when qualified personnel cannot be located.

Open/OLTP ranges in price from $1,725 to $38,640, depending on the processor. ☐

Firm's T-1 net to cut transaction costs

continued from page 2

"We can use the network to provide a dedicated voice-grade circuit to a user from New York to California at half the cost of AT&T," Walsh said.

Walsh said Garban has already agreed to sell voice services to half a dozen customers. He said the conversion to the new T-1 net is about 90% complete, and should be finished within 90 days.

Garban awarded a contract about six months ago to US Sprint Communications Co. to supply the backbone circuits.

The net will carry traffic previously routed over 100 9.6K bit/sec multidrop data lines and 300 64K bit/sec voice lines. Garban is also aggregating voice and data traffic from 9.6K and 64K bit/sec lines between here and London onto redundant, transatlantic 256K bit/sec fiber links.

The network will be supported by Timeplex, Inc. multiplexers, which will be housed in US Sprint points of presence in Chicago, Los Angeles and Washington, D.C., and on Garban's premises in San Francisco and here.

Handling sensitive information

The network will support government security trades between primary dealers. Garban brokers trades among primary dealers so the dealers aren't forced to reveal sensitive trading information.

Securities pricing data will be routed to primary dealers from a minicomputer here over the backbone network.

Traders will use dedicated voice channels, which will be compressed to run at 16K bit/sec, to issue buy and sell orders to Garban brokers.

Additionally, Garvin GuyButler, which is owned by Garban's parent company, Mills and Allen, MIA, plc will use capacity on the T-1 net to route trading data among local-area networks here and in San Francisco and Toronto.

Another Mills and Allen unit, Titus and Donnelly, Inc., will use the network to distribute municipal bond trading information from a computer here to customers. ☐

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FTS carriers asked to provide digital access

continued from page 2

Network managers complain that FTS 2000 was touted as a fully digital service, adding that the lack of digital local access facilities is undermining their networking efforts.

Jim Dolezal, chief of the telecommunications systems division at the Department of the Interior, said the agency must often settle for 9.6K bit/sec analog local access in place of 56K bit/sec links. The department relies on AT&T to arrange for local access.

The department has also been saddled with higher costs in buying multiple low-speed lines and has been forced to shelve plans for compressed video service to certain areas.

"The agencies consider it a contract issue with the GSA," Dolezal said. "We feel the GSA and the FTS 2000 vendors are responsible for providing service wherever you need it."

Bob Cann, AT&T director of operations for FTS 2000, acknowledged that discussions were under way to resolve the tensions. He said obtaining digital access facilities is difficult in remote areas of the country, noting that AT&T is dependent on local access providers to complete delivery of FTS 2000 links.

"Not having a clear statement of policy is a point of frustration to customers," said Cann. "And that's what we're working on."

In another area, complaints about a lack of high-speed long-distance services and high prices for data services under FTS 2000 are also prompting GSA action.

The GSA plans to release proposed legislation that would make use of FTS 2000 mandatory but would allow federal agencies to purchase services outside of the two FTS 2000 vendors under certain circumstances.

Government sources say the Inter-Agency Management Council — the policy-level board of directors for FTS 2000 — and the White House Office of Management and Budget are involved in shaping that legislation. ◘

DA probes BBS practices at Prodigy

continued from page 4

the system for mass mailings instead of personal messaging. Prodigy's bulletin board editing policies are justified because the bulletin boards are, in essence, electronic publications, the spokesman added. He said Prodigy has the right to edit or delete material, just as newspapers have a right to not print letters to the editor.

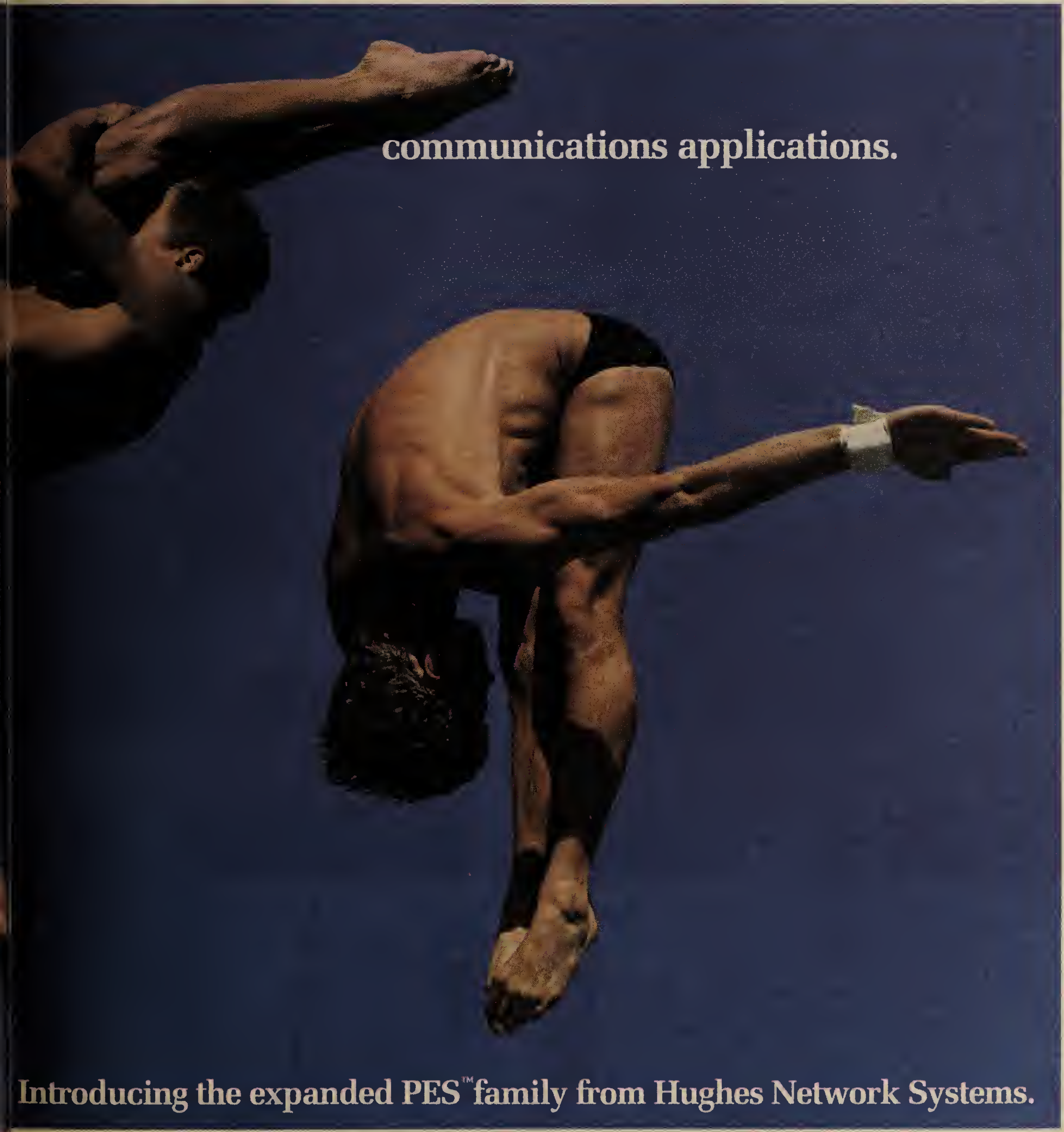
Jerry Berman, director of the American Civil Liberties Union's Information Technology Project in Washington, D.C., said the ACLU agrees with Prodigy's assertion that it has the right to edit public bulletin board systems. But he said a Prodigy policy limiting the types of private electronic messages users can send is a gray area.

Some new Prodigy rules prohibit users from sending unsolicited messages protesting pricing policies to Prodigy advertisers. Prodigy developed the rules after kicking about a dozen users off its system for allegedly engaging in that practice.

Berman said these restrictions may be justified because Prodigy is a private service, but they could also be seen as an unjustifiable restraint of free speech.

The Los Angeles investigation is not the first legal problem for Prodigy. The law firm of Greenfield & Chimicles in Haverford, Pa., recently filed on behalf of Prodigy users a class action suit charging Prodigy with deceptive advertising. It claims Prodigy touted flat-rate pricing while planning to levy charges for bulk E-mail usage.

In another case late last year, Prodigy reached a settlement with the Texas attorney general's office on charges of deceptive advertising related to E-mail pricing. Prodigy paid the state $12,500 to cover the cost of the investigation and agreed to offer refunds to some users. It did not admit any wrongdoing. ◘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1 Industry: (check one only)

- 01 ☐ Manufacturers (other than computer/communications)
- 02 ☐ Finance/Banking
- 03 ☐ Insurance
- 04 ☐ Real Estate
- 05. ☐ Healthcare Services
- 06 ☐ Legal
- 07 ☐ Hospitality
- 08 ☐ Retail/Wholesale Trade
- 09 ☐ Transportation
- 10 ☐ Utilities
- 11 ☐ Education
- 12 ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
- 13 ☐ Government State/Local
- 14 ☐ Government Federal
- 15 ☐ Military
- 16. ☐ Aerospace
- 17 ☐ Consultants (independent)
- 18 ☐ Carriers
- 19 ☐ Interconnects
- 20. ☐ Manufacturers (Computer/Communications)
- 21. ☐ VAR/VAD/Systems House
- 22 ☐ Distributor, Computer Related
- 23 ☐ Distributor, Communications Related
- 24 ☐ Other ____________

2 Job function: (check one only)

- 1. ☐ Networking Management (Responsible for both voice & data)
- 2 ☐ MIS Management (VP, Dir., Department Head)
- 3 ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
- 4 ☐ Data Communications Management (Responsible for data only)
- 5 ☐ Telecommunications Management (Responsible for voice only)
- 6 ☐ Financial Management
- 7 ☐ Engineering Management
- 8 ☐ Consultant (Independent)
- 9 ☐ Other ____________

3 What Is the scope of your involvement in purchase decisions for Network/Communications products + services? (check one only)

- 1. ☐ Enterprise Wide (Organization/Subsidiary/Division).
- 2. ☐ Multi Enterprise (Consultants)
- 3 ☐ Department Wide

4 What is the total number of sites for which you have purchase Influence?

- 1. ☐ 100+
- 2. ☐ 50 - 99
- 3 ☐ 20 - 49
- 4. ☐ 10 - 19
- 5. ☐ 2 - 9
- 6. ☐ 1

5 Your primary responsibility: (check one only)

- 1. ☐ Both Data + Voice
- 2. ☐ Data Networking Only
- 3 ☐ Voice Networking Only
- 4 ☐ None

6 Which transmission media do you use In your network: (check all that apply)

Public:
- 01 ☐ Switched-Based (DDD, Wats, Megacom, etc.)
- 02. ☐ Leased Line (not including T-1)
- 03 ☐ T-1
- 04. ☐ Fractional T-1
- 05 ☐ T-3/SONET
- 06 ☐ Broadband
- 07 ☐ ISDN

Private
- 08. ☐ Satellite
- 09. ☐ Microwave
- 10. ☐ Fiber Optic

7 Is your network: (check all that apply)

LOCAL AREA NETWORK
- 1 ☐ Local (within building)
- 2 ☐ Local (in a campus environment)

WIDE AREA NETWORKS
- 3 ☐ International
- 4. ☐ National
- 5 ☐ Regional (several states)
- 6. ☐ Metropolitan

8 What Is your network achitecture? (check all that apply)

- 1. ☐ SNA
- 2. ☐ DECNET
- 3. ☐ OSI
- 4 ☐ GOSIP
- 5. ☐ MAP/TOP
- 6. ☐ TCP/IP
- 7 ☐ DCA (UNISYS)
- 8. ☐ OTHER ________

9 What Is your LAN Operating System? (check all that apply)

- 01. ☐ 3COM (3+, 3+open)
- 02. ☐ LOCAL TALK (APPLETALK)
- 03. ☐ BANYAN (VINES)
- 04. ☐ DCA (IRMALAN)
- 05. ☐ IBM (LAN Server)
- 06. ☐ IBM (PC LAN PROGRAM)
- 07. ☐ MICROSOFT (LAN MANAGER)
- 08. ☐ UNGERMANN BASS (NET/1)
- 09. ☐ NOVELL (NETWARE)
- 10. ☐ TOPS
- 11. ☐ PROTEON (PRONET)
- 12. ☐ OTHER ____________

10 What is your LAN environment? (check all that apply)

- 1. ☐ 4M TOKEN RING
- 2. ☐ 16M TOKEN RING
- 3 ☐ ARCNET
- 4. ☐ ETHERNET
- 5. ☐ STARLAN
- 6 ☐ FDDI
- 7. ☐ LOCALTALK
- 8. ☐ 10BASET
- 9 ☐ OTHER ______

11 Which operating systems do you utilize? (check all that apply)

- 1. ☐ IBM DOS (VSE)
- 2. ☐ UNIX
- 3. ☐ OS/2
- 4 ☐ OS/2 Extended Edition
- 5 ☐ MVS
- 6. ☐ VM
- 7. ☐ VMS
- 8. ☐ XENIX
- 9. ☐ PICK
- 0. ☐ OTHER _____

12 Please indicate by vendor the number of mainframes/minicomputers installed in your network:

VENDOR	MAINFRAMES A	MINIS B
01. DEC		
02. IBM		
03. AMDAHL		
04. AT & T		
05 BULL HN IS		
06. NCR		
07. DATA GENERAL		
08. WANG		
09 HEWLETT PACKARD		
10 PRIME		
11. TANDEM		
12. UNISYS		
13 CONTROL DATA		
14. OTHER		

USE NUMBERS ONLY

13 Please indicate by vendor the number of minicomputers/workstations:

A. Presently Installed in your network.
B. Tha approximate quantity you plan to Install In the next 12 months.

MICROCOMPUTER/ WORKSTATION/ VENDOR	PRESENTLY INSTALLED A	PLAN TO INSTALL NEXT 12 MONTHS B
01 PCs based on 80286 chip		
02 PCs based on 80386 chip		
03 PCs based on 80486 chip		
04 8086/8088		
05 Macintosh		
06 RISC-based workstations		
07. UNIX-based workstations		

USE NUMBERS ONLY

14 What is your planned PC standard? (check all that apply)

- 1. ☐ EISA
- 2. ☐ MCA
- 3. ☐ NUBUS (MACINTOSH)

15 For which areas outside of the U.S. do you have purchasing influence? (check all that apply)

- 1. ☐ Europe
- 2. ☐ Asia
- 3. ☐ South America
- 4. ☐ Australia
- 5. ☐ Middle East

16 Check ALL that apply In colums A and B

A) I am presently Involved In the purchase process for the following products/services:
B) I plan to purchasa the following products/services In the naxt 12 months:

Presently Involved A	Plan to Purchase B	
		LOCAL AREA NETWORKS:
01. ☐	☐	Local Area Networks
02. ☐	☐	LAN Servers
03. ☐	☐	LAN Services
04. ☐	☐	Cables, Connectors, Baluns
05. ☐	☐	Bridges, Routers, Gateways
06. ☐	☐	UPS
07 ☐	☐	LAN Storage Devices
A	B	COMPUTERS/PERIPHERALS:
08. ☐	☐	Micros
09 ☐	☐	Minis
10. ☐	☐	Mainframes
11. ☐	☐	Front End Processors
12. ☐	☐	Terminals
13. ☐	☐	Laptops
14. ☐	☐	Printers
15. ☐	☐	Work Stations
16. ☐	☐	Cluster Controllers
17. ☐	☐	Network Management
18. ☐	☐	Micro to Mainframe
19. ☐	☐	Network Security
20. ☐	☐	Call Accounting
21. ☐	☐	Distributed DBMS
22. ☐	☐	Communications Software
23. ☐	☐	Applications Software
24. ☐	☐	Network Operating Systems Software
25. ☐	☐	EDI Software
26. ☐	☐	E-Mail Software
A	B	DATA COMMUNICATIONS:
27. ☐	☐	Modems (over 9.6kbps)
28. ☐	☐	Modems (under 9.6kbps)
29. ☐	☐	T-1 Multiplexers
30. ☐	☐	T-3 Multiplexers
31. ☐	☐	Fractional T-1 Multiplexers
A	B	
32. ☐	☐	Data Switches
33. ☐	☐	Matrix Switches
34. ☐	☐	Packet Switches
35. ☐	☐	Protocol Converters
36. ☐	☐	Network Management Systems
37. ☐	☐	Terminal Emulation Boards
38. ☐	☐	Facsimile Machines
39. ☐	☐	Diagnostic Test Equipment
40. ☐	☐	DSU/CSU
41. ☐	☐	Data Security
42. ☐	☐	Data Compression Equipment
43. ☐	☐	Network Adapter Boards
44. ☐	☐	Microwave
45. ☐	☐	Messaging Software
A	B	TELECOMMUNICATIONS:
46. ☐	☐	PBXs (over 1000 lines)
47. ☐	☐	PBXs (200 - 1000 lines)
48. ☐	☐	PBXs (under 200 lines)
49. ☐	☐	Key Systems
50 ☐	☐	Automatic Call Distributors
51. ☐	☐	Voice Messaging Systems
52. ☐	☐	Video Teleconferencing Systems
A	B	SERVICES:
53. ☐	☐	Switched Voice
54. ☐	☐	Dedicated Leased Line
55 ☐	☐	T-1
56 ☐	☐	T-3
57 ☐	☐	Digital Data
58 ☐	☐	Packet Switched
59 ☐	☐	Centrex
60 ☐	☐	Central Office Lan
61 ☐	☐	Satellite
62 ☐	☐	On-Line Information
63 ☐	☐	ISDN
64 ☐	☐	EMail
65 ☐	☐	VSAT

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17 Estimated value of networking equipment and services:

A: Which you helped specify, recommend or approve in tha 12 months?
B: Which you plan to help specify, recommend or approva In the naxt 12 months?

A	B	
1 ☐	☐	$100 million and over
2 ☐	☐	$50 - $99.9 mill
3 ☐	☐	$25 - $49.9 mill
4 ☐	☐	$20 - $24.9 mill.
5 ☐	☐	$10 - $19.9 mill
6 ☐	☐	$5 - $9.9 mill.
7 ☐	☐	$1 - $4.9 mill.
8 ☐	☐	$500,000 - $999,999
9 ☐	☐	Under $500,000

18 Estimated gross annual revenue of your entire company/institution: (check one only)

- 1. ☐ over $10 billion
- 2. ☐ $1 to $9.9 bill.
- 3. ☐ $500 to $1 bill.
- 4. ☐ $100 to $499.9 mill.
- 5. ☐ $50 to $99.9 mill.
- 6. ☐ $10 to $49.9 mill.
- 7. ☐ $5 to 9.9 mill
- 8. ☐ under $5 mill.

19 Estimated number of employees for your entire corporation:

- 1. ☐ over 10,000
- 2. ☐ 5,000 - 9,999
- 3. ☐ 2,500 - 4,999
- 4. ☐ 1,000 - 2,499
- 5. ☐ 500 - 999
- 6 ☐ under 500

20 Which of the following ISDN products do you plan to purchase in the next 12 months? (check all that apply)

- 1. ☐ Basic Rate Interface Terminal Adapters
- 2. ☐ Primary Rate Interface Equipment
- 3 ☐ Voice/Data terminals
- 4 ☐ Voice-only terminals
- 5 ☐ Data-only terminals

21 From which of the following vendors will you consider buying your PBX/Central Office Switch? (check all that apply)

A PBX	B COS	
A ☐	☐	AT&T
B ☐	☐	ALCATEL
C ☐	☐	ERICSSON
D ☐	☐	FUJITSU
E ☐		HARRIS
F ☐		HITACHI
G ☐		ROLM
H ☐		INTECOM
I ☐		MEMOREX TELEX
J ☐		MITEL
K ☐	☐	NEC
L ☐	☐	NORTHERN TELECOM
M ☐		SAMSUNG
N ☐	☐	SIEMENS
O ☐		STROMBERG-CARLSON
P ☐		TOSHIBA
Q ☐	☐	OTHER ____________

2PZ31

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